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VICTORIA HISTORY OF
THE COUNTIES OF
ENGLAND.

A history of the
county of Norfolk,
Vol. I.

12.8.74

Author

VICTORIA HISTORY OF THE
COUNTIES OF ENGLAND

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Title

A history of the county of
Norfolk. Vol. I

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The Victoria History of the
Counties of England

EDITED BY H. ARTHUR DOUBLEDAY

A HISTORY OF
NORFOLK

VOLUME I

A HISTORY OF NORFOLK
VOLUMES I AND II EDITED
BY H. ARTHUR DOUBLEDAY
VOLUMES III IV V AND VI EDITED
BY WALTER RYE

THE
VICTORIA HISTORY
OF THE COUNTIES
OF ENGLAND
NORFOLK



WESTMINSTER
ARCHIBALD CONSTABLE
AND COMPANY LIMITED

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INSCRIBED
TO THE MEMORY OF
HER LATE MAJESTY
QUEEN VICTORIA
WHO IN HER LIFETIME GRACIOUSLY
GAVE THE TITLE TO
AND ACCEPTED THE
DEDICATION OF
THIS HISTORY

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General Editor—H. ARTHUR DOUBLEDAY

GENERAL ADVERTISEMENT

THE VICTORIA HISTORY of the Counties of England is a National Survey showing the condition of the country at the present day, and tracing the domestic history of the English Counties back to the earliest times.

Rich as every County of England is in materials for local history, there has hitherto been no attempt made to bring all these materials together into a coherent form. There are, indeed, histories of English Counties; but many of them—and these the best—are exceedingly rare and costly; others are very imperfect; all are out of date.

THE VICTORIA HISTORY will trace, county by county, the story of England's growth from its prehistoric condition, through the barbarous age, the settlement of alien peoples, and the gradual welding of many races into a nation which is now the greatest on the globe. All the phases of ecclesiastical history; the changes in land tenure; the records of historic and local families; the history of the social life and sports of the villages and towns; the development of art, science, manufactures and industries—all these factors, which tell of the progress of England from primitive beginnings to large and successful empire, will find a place in the work and their treatment be entrusted to those who have made a special study of them.

Many archæological, historical and other Societies are assisting in the compilation of this work, and the editor also has the advantage of the active and cordial co-operation of The National Trust, which is doing so much for the preservation of places of historic interest and natural beauty throughout the country.

The names of the distinguished men who have joined the Advisory Council are a guarantee that the work will represent the results of the latest discoveries in every department of research. It will be observed that among them are representatives of science; for the whole trend of modern thought, as influenced by the theory of evolution, favours the intelligent study of the past and of the social, institutional and political developments of national life. As these histories are the first in which this object has been kept in view, and modern principles applied, it is hoped that they will form a work of reference no less indispensable to the student than welcome to the man of culture.

Family History will, both in the Histories and in the supplemental volumes of chart pedigrees, be dealt with by genealogical experts and in the modern spirit. Every effort will be made to secure accuracy of statement, and to avoid the insertion of those legendary pedigrees which have in the past brought discredit on the whole subject. It has been pointed out by the late Bishop of Oxford, a great master of historical research, that 'the expansion and extension of genealogical study is a very remarkable feature of our own times,' that 'it is an increasing pursuit both in America and England,' and that it can render the historian useful service.

Heraldry will also in this Series occupy a prominent position, and the splendours of the coat-armour borne in the Middle Ages will be illustrated in colours on a scale that has never been attempted before.

The general plan of Contents, and the names of the Sectional Editors (who will co-operate with local workers in every case) are as follows:—

- Natural History. Edited by AUBYN B. R. TREVOR-BATTYE, M.A., F.L.S., etc.
 Geology. By CLEMENT REID, F.R.S., HORACE B. WOODWARD, F.R.S., and others
 Palæontology. Edited by R. L. LYDEKKEER, F.R.S., etc.
 Flora { Contributions by G. A. BOULENGER, F.R.S., F. O. PICKARD-CAMBRIDGE, M.A., H. N. DIXON, F.L.S.,
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 etc., and other Specialists
 Prehistoric Remains. Edited by W. BOYD DAWKINS, M.A., F.R.S., F.S.A.
 Roman Remains. Edited by F. HAVERFIELD, M.A., F.S.A.
 Anglo-Saxon Remains. Edited by C. HERCULES READ, F.S.A., and REGINALD A. SMITH, B.A.
 Ethnography. Edited by G. LAURENCE GOMME, F.S.A.
 Dialect. Edited by JOSEPH WRIGHT, M.A., Ph.D.
 Place Names }
 Folklore } Contributed by Various Authorities
 Physical Types }
 Domesday Book and other kindred Records. Edited by J. HORACE ROUND, M.A.
 Architecture. By Various Authorities. The Sections on the Cathedrals and Monastic Remains Edited by
 W. H. ST. JOHN HOPE, M.A.
 Ecclesiastical History. Edited by R. L. POOLE, M.A.
 Political History. Edited by W. H. STEVENSON, M.A., J. HORACE ROUND, M.A., Prof. T. F. TOUT, M.A.,
 JAMES TAIT, M.A., and C. H. FIRTH, M.A.
 History of Schools. Edited by A. F. LEACH, M.A., F.S.A.
 Maritime History of Coast Counties. Edited by J. K. LAUGHTON, M.A.
 Topographical Accounts of Parishes and Manors. By Various Authorities
 History of the Feudal Baronage. Edited by J. HORACE ROUND, M.A., and OSWALD BARRON
 Family History and Heraldry. Edited by OSWALD BARRON
 Agriculture. Edited by SIR ERNEST CLARKE, M.A., Sec. to the Royal Agricultural Society
 Forestry. Edited by JOHN NISBET, D.OEC.
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 Ancient and Modern Sport. Edited by the DUKE OF BEAUFORT
 Fishing. Edited by H. CHOLMONDELEY PENNELL
 Cricket. Edited by HOME GORDON
 Football. Edited by C. W. ALCOCK
 Bibliographies
 Indexes
 Names of the Subscribers

With a view to securing the best advice with regard to the searching of records, the Editor has secured the services of the following committee of experts :—

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Among the many thousands of subjects illustrated will be castles, cathedrals and churches, mansions and manor houses, moot halls and market halls, family portraits, etc. Particular attention will be given to the beautiful and quaint examples of architecture which, through decay or from other causes, are in danger of disappearing. The best examples of church brasses, coloured glass, and monumental effigies will be depicted. The Series will also contain 160 pictures in photogravure, showing the characteristic scenery of the counties.

CARTOGRAPHY

Each History will contain Archæological, Domesday, and Geological maps ; maps showing the orography, and the Parliamentary and Ecclesiastical divisions ; and the map done by Speed in 1610. The Series will contain about four hundred maps in all.

FAMILY HISTORY AND HERALDRY

The Histories will contain, in the Topographical Section, manorial pedigrees, and accounts of the noble and gentle families connected with the local history ; and it is proposed to trace, wherever possible, their descendants in the Colonies and the United States of America. The Editor will be glad to receive information which may be of service to him in this branch of the work. The chart family pedigrees and the arms of the families mentioned in the Heralds' Visitations will be issued in a supplemental volume for each county.

The Rolls of Arms are being completely collated for this work, and all the feudal coats will be given in colours. The arms of the local families will also be represented in connection with the Topographical Section.

In order to secure the greatest possible accuracy in the descriptions of the Architecture, ecclesiastic, military and domestic, a committee has been formed of the following students of architectural history, who will supervise this department of the work :—

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The issue of this work is limited to subscribers only, whose names will be printed at the end of each History.



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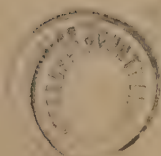
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THE
VICTORIA HISTORY
OF THE COUNTY OF
NORFOLK

VOLUME ONE



WESTMINSTER
2 WHITEHALL GARDENS
1901



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P R E F A C E

THE Advertisement of the *Victoria History* sets forth the scheme under which the *History of Norfolk* is projected. Only a small part of the whole undertaking there detailed finds a place in this volume, and it will therefore suffice to refer here only to the subject matter now presented to the reader.

The principle underlying the plan of the *Victoria History* is that of co-operation between local students of history and archæology and those who possess expert knowledge in certain periods of history or departments of archæological research. The contributors to this volume have cheerfully acquiesced in these conditions, and it is hoped that by the method adopted greater accuracy has been obtained than could otherwise have been secured.

The investigations which have been made in the course of compiling the natural history of Norfolk have brought to light the want of special studies from which the county suffers in various departments.

The tastes and inclinations of students of local natural history lie mostly in certain directions, and the less popular orders in Botany and Entomology have received comparatively little attention. Much difficulty has therefore been experienced in obtaining representative lists for some of these orders. While the imperfections to which this work must plead guilty are to be deplored, it is possible that the energies of local naturalists may be directed thereby to those departments of the flora and fauna which require further study.

It has been reluctantly decided that the Domesday Survey of Norfolk cannot be dealt with on the same lines as those adopted for other counties. Its abnormal length is but one of the difficulties; more serious are those which arise from the unsatisfactory state of the text and from the obscurity of its *formulæ*, even when the text is sound. Any translation would in fact be almost unintelligible. Those who are most competent to judge are of opinion that the time for dealing with this most difficult record is not yet ripe, and its contents are at present so imperfectly known that Professor Maitland has to speak in his *Domesday*



GEOLOGY

NORFOLK is a tolerably flat county, rising nowhere to a height of 350 feet, but forming an elevated plain which slopes gently from the west and north towards the south-east and east. The diversified scarps which occur in the west are bordered by the levels of the Fenland, and portions of the north coast are fringed by marshlands. Nevertheless, there is much to interest the geologist in the cliffs of Red and White Chalk at Hunstanton, and in the so-called 'mud cliffs' of Cromer. The Chalk itself is always a hunting-ground for fossils; while the Norwich Crag, with its abundant shells and remains of mastodon and other mammalia; the Cromer Forest Bed series, with its rich and varied vertebrate fauna and its interesting plant-remains, have engaged the attention, not only of local observers, but of distinguished geologists from all parts of the country and the Continent. The literature in consequence is copious.

If the coast scenery is for the most part monotonous, it is nevertheless modified by the bold hillocks of blown sand which here and there fringe the shores; while the inland scenery is rendered pleasant by the intermixture of heath, woodland and common, with the cultivated tracts and their richly-timbered hedgerows. Again, the isolated meres in West Norfolk, and the fine series of freshwater lakes, or Broads, in East Norfolk, offer attractions to the naturalist and to the painter, to say nothing of those who come to the Broads for rest and relaxation.

The earliest, and indeed the only independent work on the Geology of Norfolk, was that issued in 1833 by Samuel Woodward (of Norwich). Notes on particular portions of the county had already been published by earlier observers: by William Smith, R. C. Taylor and others, while shortly afterwards Caleb B. Rose (of Swaffham) printed his excellent *Sketch of the Geology of West Norfolk*. Many a worker has since added to our knowledge, among whom we should not fail to mention Lyell, Joshua Trimmer, John Gunn (formerly rector of Irstead), the late S. V. Wood, jun., and Mr. F. W. Harmer, who is still an energetic worker. During the years 1875 to 1884 Norfolk was examined in detail by the officers of the Geological Survey, from whose memoirs, sections and maps may be obtained a detailed knowledge of the structure of the entire county and full references to the observations of the many other labourers in the field of geology.

A HISTORY OF NORFOLK

The strata or formations known in Norfolk may be grouped as follows, the names in *italics* referring to those not exposed at the surface :—

Period.	Formation.	Character of the strata.	Approximate thickness in feet.	
Recent to Neolithic	Alluvium, including Submerged Forest and Fen Beds . . .	Mud, silt, clay, peat, marl and gravel	1 to 75	
	Blown Sand	Clean sand	up to 60	
	Shingle Beaches	Chiefly flint pebbles	up to 50	
Pleistocene, Palæolithic and Glacial	Brickearth	Loam and marl	up to 15	
	Valley Gravel	Sub-angular flint gravel . . .	up to 45	
	Marine Gravel and Clay . . .	Shelly gravel and clay	up to 30	
	Plateau Gravel	Boulder gravel	1 to 45	
	Boulder Clay	Chalky clay, with flints and erratics	1 to 130	
	Glacial Sand and Gravel . . .	Shelly sand and gravel	1 to 70	
	Glacial Loam and Marl	Loam, with boulders and marl	1 to 35	
Pliocene	Cromer Forest Bed	Gravel, laminated clay and peaty loam	10 to 30	
	Norwich Crag Series	Shelly sand and gravel and laminated clay	25 to 100	
<i>Eocene</i>	<i>London Clay</i>	Grey clay and sandy clay . . .	310	
	<i>Reading Beds</i>	Green sand and grey clay . . .	46	
Upper Cretaceous	Upper Chalk	Soft chalk, with nodular flints and paramoudras	about 800	
	Middle Chalk	Hard chalk, with nodular and tabular flints in upper part, and marly seams	about 300	
	Lower Chalk	Hard grey and white limestone	80 to 130	
	Red Chalk	Red limestone	4	
	Gault	Grey marly clay	30 to 60	
Lower Cretaceous	Lower Greensand {	Carstone	Brown ferruginous sandstone and grit	up to 40
		Snettisham Beds	Clay, with septarian nodules .	0 to 30
		Sandringham Beds	Light-coloured sands and flaggy sandstone	up to 100
Jurassic	Kimeridge Clay	Dark shale and clay, with nodules and bands of limestone	} thickness not proved	
	<i>Corallian</i>	Clay		
	<i>Oxford Clay</i>	Clay, with septaria		

The superficial extent of the various formations is depicted on the accompanying map.

At present no borings in Norfolk have penetrated the Jurassic rocks. The deep boring at Norwich (see p. 7) touched the Gault,

GEOLOGY

but it is not known what older formation occurs below. Palæozoic rocks, possibly even Coal Measures, might be found, as may be inferred from the fact that at Harwich old slaty rocks, presumably Silurian, were reached at a depth of little over 1,000 feet; and at Stutton, in Suffolk, similar rocks were found at a little less than 1,000 feet—in both cases immediately below the Gault.

In a well-boring at Holkham, clay, presumed to be Kimeridge Clay, was touched at a depth of 743 feet from the surface beneath the Lower Greensand; but the evidence was not satisfactory, as the clay may belong to the Lower Greensand. We know nothing eastwards of this locality of any beds beneath the Gault in Norfolk.

Hence in any trial-borings for Coal Measures it would be necessary to estimate in the western part of the county for a considerable thickness of Jurassic clay beneath a reduced thickness of the Chalk, etc.; while in eastern Norfolk, although there would be a much greater thickness of Chalk, yet the Palæozoic floor might be reached immediately beneath the Gault.¹

OXFORD AND CORALLIAN CLAYS

The oldest formation which has been proved in Norfolk is the Oxford Clay, a marine mud well developed in the neighbourhood of Oxford, and which forms vales of meadow land across the country from Dorset to Lincolnshire. A boring made in 1827 at Lynn to a depth of 630 feet, was carried through about 50 feet of alluvium and 580 feet of Jurassic clays. These clays include portions of the Oxford Clay with *Gryphæa dilatata*; of overlying Corallian Clay with *Ammonites decipiens*, *Belemnites abbreviatus*, and *Ostrea bullata*; and of Kimeridge Clay with *Ostrea deltoidea*.

Corallian clay may also occur beneath the alluvium at Denver Sluice, south-west of Downham Market, where *Ammonites decipiens* has been obtained.²

KIMERIDGE CLAY

The oldest formation which comes to the surface in Norfolk is the Kimeridge Clay, so named from its development at Kimeridge, on the Dorset coast.

It consists of dark blue, almost black, clay and shale, with occasional cement-stones, or septaria, and bands of limestone; and it has been dug for the manufacture of bricks and tiles at Downham Market, Watlington, and West Winch. As a formation it enters very little into the structure of the county; it forms part of the islet in the Fens on which Southey is situated, and it borders the eastern side of the Fenland from Downham Market to a little north of Lynn, concealed in places by intervening portions of marshland. Its soil, naturally a stiff clay suitable

¹ See H. B. Woodward, 'Geology of Norwich' (*Geol. Survey*), 1881, pp. 6, 169.

² See H. B. Woodward, 'Jurassic Rocks of Britain' (*Geol. Survey*), vol. v., 1895, pp. 61, 147. (References are there given to observations by C. B. Rose and Fitton.)

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for meadow land, is modified by down-washes of sand from the adjacent tracts of Lower Greensand and Drift.

The Kimeridge Clay represents a portion of the sea-bed somewhat distant from land, comprising marine mud, which is free from coarse materials, and in which many organic remains have been entombed. Among the more prominent are bones of large reptiles, such as *Pliosaurus*, and of fishes, such as *Asteracanthus*. *Ammonites biplex* and the small ovate bivalve known as *Lucina minuscula* are not uncommon. The characteristic oyster, *Ostrea deltoidea*, met with in the deep well at Lynn, occurs in the lower part of the formation. Bituminous shale, which may have been caused by the decomposition of animal matter, was met with at Southery. The Kimeridge Clay is not a water-bearing stratum, but it is noteworthy that some supply was met with in a boring at Downham Market, derived probably from stone bands which may have received the rainfall through the covering of Lower Greensand.

LOWER GREENSAND

A considerable interval of time may have elapsed between the deposition of the Kimeridge Clay and the overlying strata grouped as Lower Greensand, an interval represented elsewhere by the Portland stone and perhaps in part by the Purbeck and Wealden Beds. On this point however we must speak with reserve, as it seems probable from the observations of Mr. G. W. Lamplugh that the basal portions of the Norfolk Lower Greensand may represent in time the Wealden Beds of southern England.¹

The Lower Greensand comprises a group of sands and ferruginous sandstones locally hardened into Carstone. It is familiar in the brown pebbly sandstone which lies below the Red Chalk in the cliffs at Hunstanton. It is familiar also on the foreshore, where the double system of jointing in the rock has marked the pavement of Carstone into quadrangular masses separated one from another by the erosive action of the sea. Here children delight to disport themselves, jumping from one block to another by the aid of poles.

The Lower Greensand stretches southwards beneath the Red Chalk and Gault and the overlying White Chalk, from Hunstanton to Downham Market, with small outlying masses at Southery and Hilgay; the main outcrop sinking below the fen levels between Downham Market and Stoke Ferry. Where the outcrop is broad and there is an absence of boulder clay, the formation presents a diversified and picturesque tract of sloping ground, broken anon into two minor escarpments and intersected by the waters of the Middleton stream, Nar and Wissey. To the north of Dersingham the formation contains a central clayey portion between two masses of sand and sandstone. The lowermost subdivision is a mass of sharp silvery sands with streaks of fine clay about 100 feet thick, known as the Sandringham Sands—beds which take their name from the

¹ See 'Geology of the Borders of the Wash' (*Geol. Survey*), 1899, pp. 16-25.

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locality of the royal residence. These sands, according to Mr. Lamplugh, may possibly be of an estuarine character ; they are current-bedded, and they contain fragmentary plant-remains and pyritous nodules with wood. They occur at Downham Market, and may be seen in pits on Grimston Common, on Sandringham Warren, and in the railway-cutting at Wolferton. The overlying clayey beds, termed by Mr. Lamplugh the Snettisham Beds, have been worked for brick-making at Dersingham, Snettisham and Heacham. They form a belt of moist ground, the clays throwing out springs from the overlying sandy division.

Northward from Heacham the Snettisham Beds have been traced to the foreshore beneath the Carstone at Hunstanton, where the clays seen at low tide were formerly thought to be Kimeridge Clay. South of Dersingham this clayey division thins out, and its place is taken by an irregular band of gritty ironstone containing obscure casts of marine fossils. This ironstone, or ragstone, caps the Sandringham Sands on Sandringham Warren and for some distance southwards. The division is regarded by Mr. Lamplugh as a marine clay which was formed somewhat rapidly. Among the fossils, which occur in nodules of ironstone and clay-stone, are *Pecten cinctus*, *P. orbicularis*, and species of *Cardium*, *Pleuromya*, *Trigonia*, *Crioceras* and *Belemnites*, which suggest correlation with the Tealby Limestone of Lincolnshire. Leaves of plants also occur. Above this clayey division, or its equivalent ironstone, is the Carstone. It is the chief building-stone of Norfolk : a brown friable rock known as 'Gingerbread Stone,' which is largely quarried and hewn into shape at Snettisham, and was formerly worked at Middleton and other places. Small pebbles of lydite or chert are conspicuous in the rock at Hunstanton, and stone of this character was in old times fashioned into querns. At Hunstanton, there are found in the base of the division phosphatic nodules and also concretionary masses of hard grit yielding *Ammonites deshayesi*, *Perna mulleti*, and other fossils suggestive of the Atherfield Clay of southern counties. Black phosphatic nodules and fossils have also been found between the top of the formation and the base of the Gault at West Dereham, where formerly they were dug. The fossils resemble those of the base of the Folkestone Gault. In mass the Carstone may represent the Hythe, Sandgate, and Folkestone Beds of the south-east of England.¹ It was probably deposited in a somewhat deeper sea than the Snettisham Beds, as indicated by its wide extent and uniformity.

The Lower Greensand where exposed at the surface forms dry heathy commons and warrens, with occasional tracts of woodland, and the land rises to about 120 feet. The soil is deep and sandy, and sometimes crimson or purplish in colour. That of the lower sands can hardly be called fertile, but a better soil is furnished by the Carstone. It is a water-bearing formation, but it has yielded several ferruginous or chalybeate springs, one of which, formerly of local repute, occurs at Gaywood, near Lynn. Ochre has been worked at this locality, and

¹ G. W. Lamplugh, notes in *Geology of the Borders of the Wash*, pp. 16-25.

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some iron-ore was obtained at one time near Ash Wicken and Wormegay. The Lower Greensand has been proved to occur beneath the Chalk as far eastwards as Hoikham.

GAULT AND RED CHALK

The Lower Greensand is succeeded by the Gault and Red Chalk, which practically replace one another as we pass from the southern outcrop near West Dereham northwards to Dersingham.

There is no representative of the Upper Greensand in Norfolk, although specimens supposed to indicate it were identified in the deep boring which penetrated the Chalk at Norwich.¹ It is, however, generally admitted that in other parts of England the Gault and Upper Greensand form one group to which the name Selbornian, from Selborne in Hampshire, has been applied by Mr. A. J. Jukes-Browne. In some tracts, as in Devonshire, the formation is almost wholly sand; in others, as in East Kent, it is almost wholly clay; in the intermediate tracts there is an upper division of sand and a lower division of clay. In the Gault and Red Chalk of Norfolk we have represented in time the Selbornian of other tracts.

The Norfolk Gault is more calcareous in character than it is elsewhere. It is a bluish-grey marly clay, which on drying appears of a greyish-white colour; while the Red Chalk is in reality a chalky deposit, and locally marks the incoming of Chalk conditions earlier than in more southern counties. Moreover, it has yielded some species of fossils not elsewhere known to occur below the White Chalk.

The Gault is from 20 to 60 feet thick, and contains at its base a layer of phosphatic nodules, or 'coprolites,' which have been worked at West Dereham—a locality where phosphatic nodules also occur in less abundance in the upper part of the Lower Greensand. The Gault extends through Shouldham and Gayton northwards as far as Dersingham, where, according to Mr. Jukes-Browne and Mr. William Hill, it passes down into a brown and red marly clay about 4 feet thick, and is finally replaced northwards by the Red Chalk.²

The fossils of the Gault include fishes, such as *Beryx*, also *Ammonites interruptus*, *A. rostratus*, *A. lautus*, *Belemnites minimus*, *Inoceramus sulcatus*, etc.

Copious springs are here and there thrown out at the junction of the Chalk and Gault, for the lower portions of the Chalk in Norfolk are not impervious.

The Red Chalk, or Hunstanton limestone, has attracted much attention from geologists, as it forms a very conspicuous band in the cliff at Hunstanton, at the base of the White Chalk and above the brown Carstone.³ It is in reality a limestone containing from 80 to 83 per

¹ C. B. Rose, *Proc. Geol. Assoc.*, vol. i. p. 226; F. Kitton, *Trans. Norf. Nat. Soc.*, vol. i. pp. 81.

² *Quart. Journ. Geol. Soc.*, vol. xliii. p. 544.

³ The literature is fully dealt with by Mr. Whitaker, *Proc. Norwich Geol. Soc.*, vol. i. p. 212.

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cent. of carbonate of lime, from 8 to 10 per cent. of peroxide of iron, and a little sand and clay. Whether the iron ore was original or derived from the underlying ferruginous carstone is a question difficult to answer. Tiny pebbles or grains of quartz are met with in the bed, which is but 4 feet thick. In its upper part it contains a branching structure, formerly supposed to be a fossil, and named *Spongia paradoxa*. This occurs also in the lowest part ('Sponge bed') of the White Chalk. It has been shown by Prof. T. McK. Hughes to be simply a concretionary structure.¹

Fossils occur abundantly in the Red Chalk, as is the case elsewhere with formations that are represented in an attenuated condition. It was evidently formed slowly, and the zonal distinctions elsewhere met with in equivalent strata cannot be defined. *Belemnites minimus* and *Terebratula biplicata* are abundant.

In a well-boring at Holkham a bed resembling Red Chalk was found beneath the White Chalk, and above a bed of Gault clay, and it is probable that in one form or another the Gault extends from its outcrop in West Norfolk eastwards beneath the greater portion of the county.

CHALK

The White Chalk undoubtedly forms the foundation of the main part of Norfolk. Its base, exposed in the cliff at Hunstanton, extends southwards along the borders of the Gault in the west of Norfolk, while the whole formation is inclined very gently (at an angle of less than 1°) towards Norwich and Yarmouth, where on the coast its upper limit occurs about 500 feet below sea-level. Probably the Chalk attains its full local thickness where it is covered by Eocene strata at Yarmouth, and it has been estimated to be about 1,400 feet. At Norwich the Chalk was proved to a depth of 1,152 feet, and some further thickness is exposed in the adjacent hills.

The Chalk is divided into Lower, Middle, and Upper Chalk, but the scenery produced by the formation in Norfolk differs markedly from that in the southern and southern-midland counties. We find no conspicuous escarpments nor downs, because the Chalk has been abraded and covered by Glacial Drifts, which greatly modify its features.

The Lower Chalk in Norfolk is for the most part a hard white limestone with the 'Sponge-bed' before noticed at its base, and it exhibits in places the curved jointing so conspicuous in the Cambridge clunch. It is a comparatively pure chalk with 95 per cent. of carbonate of lime, but it contains occasional seams of marl. It is characterized by *Ammonites varians*.

Overlying the Lower Chalk is a representative of the Totternhoe Stone—a sandy and glauconitic chalk with green-coated phosphatic nodules, from 2 to 4 feet thick, and yielding *Holaster subglobosus*. This bed was first observed near Stoke Ferry and Roydon by Mr. William Whitaker. Above it is a hard grey chalk 35 to 40 feet thick, char-

¹ *Quart. Journ. Geol. Soc.*, vol. xl. p. 273.

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acterized by *Belemnitella* (*Actinocamax*) *plena*. This division has been quarried at Stoke Ferry and Marham, at Hillington, Dersingham, Heacham and Hunstanton. At Marham the hard chalk has been used for building-purposes, and elsewhere for lime and whiting. Among other fossils in the Lower Chalk are remains of fishes also *Ammonites mantelli*, *A. rotomagensis*, *Inoceramus latus*, *Ostrea vesicularis*, *Rhynchonella mantelliana*, *Terebratula biplicata*, *T. globosa* and *Discoidea cylindrica*.

In the beds at Gayton Mr. Whitaker noticed small boulders of granitic and other igneous rocks, a fact of considerable interest as such erratic materials in the Chalk are by no means of frequent occurrence, and they suggest transport by icebergs.

The boundary between the Lower and Middle Chalk extends from Hockwold-cum-Wilton to Narford and Gaytonthorpe.

The Middle Chalk comprises hard bedded white chalk with a few seams of marl and many layers of flint, including tabular flints and occasional Paramoudras (see p. 9). Traces of a hard band representing the Melbourn Rock of Cambridgeshire have been noticed at its base at Shernborne and to the south-east of Heacham. The Middle Chalk has been well exposed at Methwold, and again at Sedgeford, Hillington, Great Massingham, Harpley and Docking.

Among the fossils of this division are *Ammonites peramplus* (which occasionally measures 2 feet in diameter), *Inoceramus curvieri*, *I. mytiloides*, *Rhynchonella curvieri*, *R. plicatilis* and *Echinoconus subrotundus*.

It has been found difficult in Norfolk to draw a definite line of boundary between the outcrop of Middle and Upper Chalk owing to the want of evidence of the Chalk Rock, which in many localities further south and south-west forms a marked horizon. This rock has been observed in Norfolk only in one locality west of Swaffham, where it is but a foot thick.

The Upper Chalk is for the most part a soft chalk, characterized by numerous nodular flints and by huge forms known as Paramoudras.

These flints were in all cases formed subsequently to the deposition of the chalky mud; some originated during its consolidation, others like the occasional tabular flints fill horizontal, oblique and vertical planes of shrinkage and faulting.

The siliceous matter of the nodules is of organic origin due to the presence and decay of siliceous organisms, and especially sponges. Not only sponges, but also mollusca, echinoderms, and occasionally reptilian teeth, acted as nuclei around which the flinty matter was concentrated.

The nodules, like septaria in clay formations, usually coincide with the planes of stratification, because the superficial layers of chalky mud became saturated with silica due to the subsidence and decay of siliceous organisms. Hence the nodular layers were probably formed stage by stage during the gradual accumulation and consolidation of the Chalk. Dr. G. C. Wallich suggested that the Paramoudras, which sometimes occur in vertical rows, were due to sluggish flows of highly siliceous layers into hollows of the sea-bed. Other observers have suggested that

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they were formed around large sponges whose subsequent decay gave rise to the central cavity.

Paramoudras or Pot-stones were first noticed by Dr. Buckland in the Chalk of Antrim, and the name is probably derived from an Erse word signifying 'sea pear.' In form many are smooth pear-shaped bodies from 8 inches to 2 feet and more in length, and from 8 inches to 1 foot or more in diameter. Others are of very irregular shape, with numerous flinty protuberances. All have a central cavity, and occasionally two cavities have been observed. They were noticed by Lyell in 1825 at Horstead, and they occur in many of the pits near Norwich. Noteworthy examples are also to be seen on the foreshore at Sheringham and Runton, where sometimes they are surrounded by rings of nodular flints.¹

Tabular flints occur in the Chalk near Swaffham and Wells. At Swaffham some layers are eight or more feet in length, and from 9 to 12 inches thick. At Thetford the Chalk contains cylindrical flints which are very sonorous when struck.

The lowest portion of the Upper Chalk at Swaffham, North and South Creak, and Burnham Overby, is characterized by *Micraster coranguinum*; *Echinoconus conicus* is also found in it.

The middle portion of the Upper Chalk, as at Wells, Walsingham, and perhaps at Diss, is characterized by *Marsupites*; while the upper portion, so well exposed near Norwich, is known as the Belemnitella Chalk, containing *Belemnitella mucronata* and *B. lanceolata*, also *Pecten nitidus*, *P. concentricus*, *Terebratula carnea*, *Echinocorys vulgaris*, *Cardiaster granulosus*, and remains of a large reptile allied to *Mosasaurus*.

On the Norfolk coast the Chalk which appears at Hunstanton does not again form cliffs until we reach Weybourne, where it rises to about 20 feet and is covered by the Crag and Glacial Drifts. It disappears below the sea-level east of Cromer, to reappear only for a short distance in the cliffs of Trimingham.

The very highest Chalk observable in Norfolk is that at Trimingham, which has been disturbed by Glacial agency (see p. 19). It contains many porous spongiform flints, and one sandy seam a foot thick. Among the fossils are *Belemnitella mucronata*, which serves to link it with the Norwich Chalk; also a large *Gryphæa*, *Magas pumilus*, and the true form of *Terebratulina gracilis*.

The Chalk has been largely worked for lime-burning, for whiting, and for its flints near Norwich; and often the pits have been extended underground in galleries of great length in order to avoid moving the superficial strata or 'uncallow.' Some of these workings, as on Heigham Hill, date back more than three hundred years. Chalk from Whitlingham has been sent to Burgh Castle, near Yarmouth, where mixed with river-mud it has been manufactured into Portland cement.

The black flints have been extensively used for building purposes, and notably for the inlaid flint-work so characteristic of church towers

¹ See C. B. Rose, *Proc. Geol. Assoc.*, vol. v. p. 514, and C. Reid, 'Geology of Cromer' (*Geol. Survey*), 1882, p. 4.

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and porches in East Anglia. The Old Bridewell by St. Andrew's Church, in Norwich, is a fine example of flint-work dating back to about 1400. The faces of the flints often exhibit tiny conchoidal fractures, which were no doubt produced when the blocks of flint were fixed by the workmen; subsequently the tiny portions of fractured flint have weathered out.

Gun-flints have until comparatively recent days been manufactured at Catton and Whitlingham, near Norwich, and also at Broomhill on the Norfolk side of the Little Ouse, near Brandon.¹

At Grime's Graves, in the parish of Weeting, in Norfolk, and about three miles north-east of Brandon, a number of ancient flint-pits occur, and these were sunk in prehistoric times through 10 or 15 feet of sand into the Chalk and to a particular layer of flint. In one working this layer was found to be 39 feet from the surface. It is the same bed as that from which gun-flints have more recently been made. In the ancient excavations, which were explored by Canon Greenwell, the flint-mining had been carried on mainly by means of picks formed from antlers of the red deer, many of which were discovered.² In these and other pits, as remarked by Sir John Evans, there appears to have been in very early days an organized manufactory for flint instruments.³

Along the borders of the river Bure, as at Horstead and Wroxham, picturesque canals for wherries have been formed as the Chalk has been excavated in the hill-sides.

As a water-bearing formation the Chalk in England stands foremost. In Norfolk it is largely covered with Drift deposits, and hence does not directly receive so much of the rainfall as it does in some other counties. This is more especially the case in the eastern portion of Norfolk; nevertheless good supplies of water have been obtained by boring at Cromer, Mundesley and North Walsham, as well as at Norwich. On the western side of the county the Drifts are thinner, less continuous, and less impervious than on the east.

The mass of the Chalk in Norfolk down to the Gault is practically porous, and the water falling on it would tend generally to move eastwards over the gently inclined floor of the Gault, until the whole being saturated the surplus above sea-level would escape in springs along the base of Chalk cliffs, in the deeper valleys, and along the western margin over the lip of Gault clay. Occasional marl seams and tabular masses of flint locally arrest supplies of water. The plane of saturation varies of course with the amount of rain, and this underground water-level falls to some extent with the slope of the ground, so that in West Norfolk it descends gradually westwards towards the outlet taken by the springs. As the saturation-level rises so springs break out at higher horizons, and instances of bournes are met with after much rain. Thus the Babingley stream, which ordinarily rises about half a mile above Flitcham Abbey, after heavy and prolonged rain rises (as observed by Mr. Whitaker) at

¹ S. B. J. Skertchly, 'Manufacture of Gun-flints' (*Geol. Survey*), 1879.

² Greenwell, *Journ. Ethnol. Soc.*, vol. ii., 1871, p. 425.

³ Evans, *Ancient Stone Implements, etc., of Great Britain*, ed. 2, 1897, pp. 33-35.

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intervals to near Massingham. Again the Wensum, whose ordinary source is at Wickend Pond, north of Tatterset, rises nearer to Barmer in very wet weather.

Among the noteworthy Chalk springs are those of Marham, which are utilized for the water-supply of Wisbech and some of the Fenland villages; while the springs thrown out by the Gault east of Appleton are used for the supply of water to Sandringham House. Springs which issue below high-water mark from the Chalk at Wells gave rise to the name of the town; while the wishing wells at Walsingham are also derived from the Chalk.

In West Norfolk the natural pools of water known as Meres, which occur on the heaths of Roudham and Wretham, indicate the plane of saturation of the Chalk, and may partly owe their form to dissolution of the Chalk. Some have no apparent outlet, others lie along the course of the Wissey. Diss Mere is probably of the same character. It lies in the Glacial sands, but the water is evidently derived and maintained by Chalk springs.¹

The surface of the Chalk at different localities has been subject to local erosion by the action of carbonated water. Thus great 'pipes,' sometimes 20 feet deep and 5 feet across, have been formed, and these are in places filled with gravel and sand or other accumulations which have subsided into the cavity formed. This process may be a slow one, but it sometimes occurs suddenly.²

The Chalk formation as a whole indicates a deep sea—the material being for the most part the calcareous mud or ooze which has been produced by the decay of various organisms, many of them of the lowly type of Foraminifera.

READING BEDS AND LONDON CLAY

Although Eocene strata are nowhere in Norfolk exposed at the surface it is appropriate here to consider them, because locally they come in direct succession to the Chalk, despite the break in time between the two groups. Indeed the Eocene deposits may be said to be as nearly connected with the Chalk in Norfolk as they are in other parts of England, for although we have no distinct representation of the Thanet Sands, which form the lowest Eocene division in Essex and Kent, yet at Trimingham we find a higher stage of the Chalk than is known elsewhere in this country.

The Eocene strata have been proved only in one spot, in a boring for Lacon's Brewery, at Yarmouth, where beneath 120 feet of superficial deposits and Crag there were found 310 feet of London Clay and 46 feet of green sands and grey clays belonging to the Reading Beds.³ It is

¹ F. J. Bennett, 'Geology of Attleborough,' etc. (*Geol. Survey*), 1884, p. 17; 'Geology of Diss,' etc. 1884, p. 3.

² J. Evans, *Geol. Mag.*, vol. v. p. 445; H. B. Woodward, *Trans. Norf. Nat. Soc.*, vol. iii. p. 641.

³ Prestwich, *Quart. Journ. Geol. Soc.*, vol. xvi., p. 450.

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highly probable that they extend some distance inland beneath the Norwich Crag and Glacial beds, perhaps as far westwards as Happisburgh or Bacton on the north coast, and southwards through Stalham, Acle and Reedham.

Although no Eocene fossils have been found *in situ* in the area, elsewhere the equivalent strata furnish evidence of estuarine conditions and of a tropical fauna and flora.

It is noteworthy, however, that some derived Eocene or Oligocene mollusca have been recorded from the Crag;¹ that Eocene pebbles have been observed in the Glacial Drift of Norfolk;² and that the jet and amber dredged off the coast or found in the Cromer Forest Bed and on the beach, have probably been derived from Eocene or Oligocene beds under the North Sea. Moreover it is not unlikely that the clayey bands in the Norwich Crag Series were derived from Eocene strata, which locally bordered the sea during the Pliocene period.

Be this as it may the record of Eocene strata tells of a period of quiescent shallow water and estuarine deposits which occupied a considerable portion of what is now East Norfolk, but may not have extended over the entire area of the county. The Chalk towards the west, which was then connected with the Lincolnshire Chalk, must have been upheaved in certain tracts so as to form cliffs which yielded the materials of the Eocene flint pebble-beds.

Afterwards, and presumably during the Miocene epoch of which we have no actual deposit in this country, the Eocene strata and Chalk were further up-tilted on the west, and denudation of the Chalk, which had been commenced in Eocene times, was continued by subaërial agents. In course of time the Red Chalk of Hunstanton, which originally may have been 2,000 feet below sea-level, was upraised above it in West Norfolk, and brought to light by the denudation of the overlying beds of White Chalk.

We may infer that in these early times the dissolution of the Chalk and the destruction of the Tertiary strata led to a superficial accumulation akin to the clay-with-flints of our southern counties.

A depression in Pliocene times, which affected what is now East Suffolk before any part of Norfolk was submerged, brought in deposits of the earlier Crag, and during later stages much of East Norfolk was gradually lowered beneath the sea-level. At this time probably the North Sea area first began to assume a definite form.

NORWICH CRAG AND FOREST BED SERIES

The Pliocene deposits which rest indifferently on the Eocene strata and the Chalk, stretch in mass across the eastern part of Norfolk and form the earliest stages of a succession which links us without serious break with the present. There is little doubt that these deposits are represented

¹ S. V. Wood, 2nd Supp. to *Monograph of Crag Mollusca* (Palæontograph. Soc.), p. 40.

² Rev. O. Fisher, *Geol. Mag.*, vol. v. p. 549.

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at Yarmouth ; they are exposed beneath the Glacial Drifts on the coast from Happisburgh to Weybourne, and inland along the borders of the Bure, Yare, Wensum, and Waveney. They extend as far west as Guist, and as far south as Harleston, Ditchingham and Aldeby. In the Bure valley they rise occasionally into islets in the Alluvium, known as Holms or Holmes, as St. Benet Holme. They comprise a variety of deposits to which many local names have been given ; but broadly speaking they may be separated into a lower division, the Norwich Crag Series, and an upper series the Cromer Forest Bed.

The Norwich Crag Series consists of sand and pebbly gravel with seams of laminated clay, and with patches here and there of Crag shells, the common fossils being many of them species now existing, such as the cockle (*Cardium edule*), the mussel (*Mytilus edulis*), and the periwinkle (*Littorina littorea*), while others are extinct forms.

The series varies in thickness from 30 feet near Norwich to 95 feet at Harleston. The beds may be thicker also under Yarmouth, as from the evidence of well-borings we find the Crag to become thicker towards the North Sea.

In appearance it may be likened to an extensive raised shallow seabed ; it includes deposits laid down in shoals and sand-banks, with channels eroded by currents. The incoming of freshwater, probably from streams entering sandy bays, has influenced some of the mollusca, as may be seen in the varieties and monstrosities of the purples and periwinkles, and also in the remains of land and freshwater mollusca. The bands of laminated clay, as remarked by Mr. Reid, seem to indicate more estuarine conditions.¹

Borings of *Pholas* and Annelides are occasionally seen in the Chalk platform on which the Crag lies ; and abundant remains of barnacles, of *Pecten opercularis* and *Tellina crassa* are there met with in its lowest beds.

The oldest portions of the Crag which have been termed Fluvio-marine on account of their containing remains of land and freshwater shells, are best seen at Bramerton and Thorpe near Norwich, localities from which the majority of the well-known fossils have been obtained. At one pit at Bramerton the Crag is locally as red as much of the Red Crag in Suffolk.

At the base is a Mammaliferous stone-bed, a layer from 1 foot to 18 inches thick, of unworn and little worn flints, derived from the Chalk, together with pebbles of quartz and quartzite, in and above which bones and teeth of deer, antelope, mastodon, and *Elephas antiquus* (including portions of the tusk of that elephant) have been found. This stony base is not however confined to the same geological horizon, it underlies newer stages of the Crag, and was evidently a marine basement-bed formed as the Crag sea encroached on the Chalk area, for we have evidence that the lower stages of the Crag were overlapped by higher strata as we proceed northwards and north-westwards.

¹ 'Pliocene Deposits of Britain' (*Geol. Survey*), 1890, p. 131 ; see also F. W. Harmer, *Quart. Journ. Geol. Soc.*, vol. lii. p. 768.

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The occurrence of shells in the Crag is very local, in many sections we find no fossils ; but it is natural that only the fossiliferous localities have attracted great attention.¹ In some places *Nucula cobboldiæ*, in others *Cyprina islandica*, or *Scrobicularia plana* abound. Almost everywhere *Tellina obliqua*, *T. prætenuis*, *Pecten*, *Cardium*, *Mactra*, *Cerithium tricinatum* and fish-remains occur where shell-patches have been opened up. The lower beds more usually contain shells because of the protection afforded by bands of clay, which, where prominent, are usually regarded as Chillesford Clay. Above this horizon we sometimes find layers of iron-pan or ferruginous sandstone and gravel with casts of shells. Ochreous nodules also occur, and these appear to be due to the contemporaneous breaking up of clay-seams, the clay pebbles thus formed having acted as nuclei for the subsequent deposition of brown iron ore. Ochre was formerly obtained from the Crag Series at Eaton, near Norwich.

To the occurrence of two bands of shells at Bramerton Mr. J. E. Taylor drew attention in 1865. The higher band has been recognized as containing a larger percentage of northern mollusca, and its more abundant species belong to somewhat deeper water, while in it there are fewer land and freshwater mollusca than in the lower band. Three horizons of shells occur locally at Whitlingham, while at Thorpe, the highest stage, which yields casts of shells, is newer than any of the shell-beds at Bramerton and Whitlingham. This highest stage at Thorpe is approximately equivalent to the Weybourne Crag, which overlapping other stages occurs directly on the Chalk at Weybourne. It is also met with in places in the Bure valley, as at Belaugh (hence the name Bure Valley Crag). All the marine shells found in this newer Crag, except *Tellina balthica*, and *Anomia striata* occur also in the lower portions of the Norwich Crag, but the assemblage of species is more arctic in character. On account of the presence, and indeed abundance, of the *Tellina*, this highest sub-division has also been termed the *Tellina-balthica* Crag.

Towards the upper part of the Norwich Crag there is locally developed, as at Aldeby, Surlingham, Wroxham and Coltishall, masses or 'jambs' of micaceous sandy clay, or clay interlaminated with films of sand, and known as the Chillesford Clay, from the village of Chillesford, near Orford, in Suffolk. This clay, which is from 1 to 18 feet thick, has been used for brick-making at the localities above-named, and also at Eaton near Norwich, where a pottery kiln existed in the time of Queen Anne. The Crag yields water, especially when the Chalk is water-logged, and the higher portions of the series yield water, which is locally upheld by the Chillesford Clay.

Above the horizon of the Weybourne Crag occurs the famous Forest Bed Series, or Cromer Forest Bed, an accumulation which immediately preceded the Glacial deposits. Evidence of increasing cold is furnished in the deposits overlying this series.

Huge bones of elephant and rhinoceros have been known since early times to occur in the Forest Bed, and they gave rise to the tradition

¹ See S. V. Wood, *Monograph of the Crag Mollusca* (Palæontograph. Soc.).

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that there were giants in former days. The records of William Arderon (1746), of Richard Cowling Taylor (1822), later on those of Lyell, Prestwich, John Gunn, and more recently of Mr. Clement Reid, have brought vividly before us the character and physical conditions under which this variable series was accumulated. Although stumps of trees, apparently rooted on the spot, have been noticed again and again, yet in every case where attention has been paid to the particular nature of the stumps, it has been found that they have been drifted, not necessarily very far, but no single example in the main portion of the Forest Bed has been proved to have grown on the spot. The Forest Bed itself is of an estuarine character, the deposits being connected with the former extension of the Rhine. Beneath it and above the Weybourne Crag is a Lower Freshwater Bed, which however is known chiefly from derived Pholas-bored cakes of peat and clay-ironstone found in the Estuarine Forest Bed. The Forest Bed consists of ferruginous quartzite gravel, sometimes cemented into an iron-pan, with bands of laminated clay, numerous masses and fragments of wood, mammalian bones and estuarine mollusca. It is but 10 or 15 feet thick.

Above the Forest Bed is a second or upper Freshwater Bed, marked at its base by a soil—the weathered upper part of the Estuarine Forest Bed—and this being penetrated by small roots is known as the Rootlet Bed. It contains the only vegetable growth *in situ* that has been noticed. Above it, and occupying hollows here and there, are lacustrine peaty beds, which have been observed at several localities between Sheringham and Mundesley. The well-known ‘black bed’ at Runton has yielded specimens of the giant beaver, *Trogontherium*, and other remains, and in the equivalent Unio-bed at Sidestrand there have been found *Unio tumidus*, *Hydrobia marginata* and other freshwater shells.

The occurrence in the Estuarine Forest Bed of specimens of amber and jet, derived from Eocene or Oligocene strata, has before been mentioned. Specimens of them collected on the beach are sometimes manufactured into ornaments by local lapidaries. One of the largest specimens of amber which was dredged off Yarmouth weighs thirty-eight ounces. Mr. Reid has observed that the amber is cast on shore usually after easterly gales; and he believes that both amber and jet may be derived from a bed on the same horizon as the well-known deposit on the Prussian coast, because the easterly dip of the Norfolk strata might bring in Upper Eocene and Oligocene beds a short distance east of Yarmouth. Remains of insects and arachnids are found in the amber, and these include an *Aphis*, several flies and one spider.¹

Evidence of the former extent of the Forest Bed has been observed in the Happisburgh oyster-bed, three miles from the coast, where bones and teeth of elephant were formerly dredged (see p. 24).

Among the animal remains from the Forest Bed Series are the sabre-toothed tiger or *Machærodus* (found also in Kent’s Cavern,

¹ C. Reid, ‘On Norfolk Amber,’ *Trans. Norfolk Nat. Soc.*, vol. iii. p. 601; vol. iv. p. 247; and H. Conwentz, ‘On English Amber,’ etc., *Nat. Science*, vol. ix., Aug. 1896, p. 99.

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Torquay), the wolf, hyæna, cave bear, glutton, bison, musk ox, numerous deer, hippopotamus, *Rhinoceros etruscus*, *Elephas meridionalis*, and *E. antiquus*, the Russian desman (*Myogale moschata*), and many other forms, as well as birds, reptiles, amphibians, fishes, etc.¹

If the fauna of the Forest Bed is of great interest, no less so is its flora, for our knowledge of which we are especially indebted to the labours of Mr. Clement Reid. He has pointed out that while the cold of the succeeding Glacial period drove out many species, yet they must have survived within a moderate distance from England. Among those found in the Forest Bed Series, the following may be mentioned :—

Yellow water-lily (<i>Nuphar luteum</i>).	Alder (<i>Alnus glutinosa</i>).
Mare's tail (<i>Hippuris vulgaris</i>).	Birch (<i>Betula alba</i>).
Water chesnut (<i>Trapa natans</i>).	Willow (<i>Salix</i>).
Bog-bean (<i>Menyanthes trifoliata</i>).	Pondweeds (<i>Potamogeton</i>).
Golden dock (<i>Rumex maritimus</i>).	Reeds (<i>Phragmites</i>).
Hornwort (<i>Ceratophyllum demersum</i>).	Scotch Fir (<i>Pinus sylvestris</i>).
Elm (<i>Ulmus</i>).	Spruce Fir (<i>Picea excelsa</i>).
Oak (<i>Quercus robur</i>).	Yew (<i>Taxus baccata</i>).
Beech (<i>Fagus sylvatica</i>).	Royal fern (<i>Osmunda regalis</i>).
Hazel (<i>Corylus avellana</i>).	

Mr. Reid observes that the plants are aquatic and wet-meadow species and forest trees, and all that have been found in the deposits, except *Trapa natans*, *Najas minor* and *Picea excelsa*, are now natives of Britain.²

Above the Upper Freshwater Bed there is a deposit of marine sand known as the *Leda-myalis* bed, and equivalent to the 'Mundesley Beds' described by Prestwich.³ This may be regarded as a passage-bed between Pliocene and Glacial deposits. Still higher than this is a bed which indicates more distinctly the incoming of colder conditions. It was first noticed by Dr. Alfred Nathorst in 1872, beneath the Glacial Drift at Mundesley, and he then discovered remains of arctic plants in it. The same horizon was a few years later detected by Mr. Reid at Beeston, and at Ostend, near Bacton. The arctic birch (*Betula nana*), the arctic willow (*Salix polaris*), and *Hippuris vulgaris* are among the plants. They appear to have flourished in the area when it was approximately about the same level as now, and before the incoming of any masses of the ice of the Glacial period.

¹ See E. T. Newton, 'Vertebrata of the Forest Bed Series' (*Geol. Survey*), 1882; and 'Vertebrata of the Pliocene Deposits of Britain' (*Geol. Survey*), 1891. See also *Memorials of John Gunn*, 8vo, Norwich, 1891.

² 'On the Flora of the Cromer Forest Bed,' *Trans. Norfolk Nat. Soc.*, vol. iv. p. 189; *The Origin of the British Flora*, 8vo, London, 1899.

³ *Report Brit. Assoc. for 1881*, p. 620.

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GLACIAL DRIFT

The succeeding strata of Lower Boulder Clay, comprising beds of stiff unstratified Till with intermediate laminated muds, tell of Glacial conditions when ice extended over the area and temporarily retreated during the intervals when the glacier mud was spread over a limited area. The Till itself contains much Chalk and many glaciated erratic stones. The softer chalky material is often crushed, the deposit having a streaky fluxion-structure, regarded by Mr. Reid as due to the sliding pressure of an ice-sheet. Blocks from Scandinavia, such as the 'Rhomben porphyr,' have been identified.

The Lower Boulder Clay is best seen in the cliffs at Happisburgh, Bacton and Mundesley. It is overlaid by a mass of contorted loams and sands, the disturbances in which form one of the remarkable features in the 'mud cliffs' of Cromer. Fragments of *Tellina baltbica*, *Cardium edule*, *Cyprina islandica* and *Mya arenaria* occur in the loams, and more abundantly in the sands. Between Overstrand and Sheringham the beds contain huge incorporated strips or boulders of Chalk—one mass measuring 500 feet in length.¹ In this remarkable instance, as in some other cases, the flint-layers in the Chalk masses were comparatively undisturbed. Elsewhere the masses of Chalk have been crushed, the flints fractured, and the fragments scattered. Again, in other instances the Chalk has been ground up and intermixed with clay, and it forms huge masses of marl which are dug for lime-burning, the lime being well suited for agricultural purposes. Many old pits also occur in the fields, whence the marl was formerly dug to put on the land.

As we pass from east to west, so the Contorted Drift (as it is called) becomes less loamy and more and more marly. In East Norfolk the calcareous loam of Happisburgh and Bacton, which yields a rich soil, constitutes some of the best agricultural land in Norfolk. It extends inland to Ludham, Tunstead, Plumstead and Hamlington. Near Norwich, where it is known as the Norwich brickearth, it has been largely worked for brick-making on the borders of Mousehold. In older times it was dug near Markshall, where traces have been found of a Roman kiln situated not far from Caistor Camp.

Large boulders of basalt, quartzite and other rocks have been occasionally encountered in agricultural operations on the loamy subsoil of the Contorted Drift, and the blocks have been removed to adjacent villages and homesteads, where they are placed alongside buildings for protection or for use as horse-blocks.

On the coast where the cliffs of Contorted Drift contain great masses of sand, the winds, and especially the easterly and north-easterly breezes, blow away the sand and accelerate the destruction of the cliffs. Adjoining the coast near Cromer and Runton, as Mr. Reid has remarked, occasionally the whole of the top soil of a field may be blown away,

¹ See Lyell, 'On the Boulder Formation, or Drift and associated Freshwater Deposits composing the Mud-cliffs of Eastern Norfolk,' *Phil. Mag.*, ser. 3, vol. xvi., 1840, p. 345.

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together with the seed that has been sown, the material being heaped against a neighbouring bank.

The sands (sometimes termed 'Middle Glacial') which underlie the main mass of Chalky Boulder Clay have been exposed on the coast south of Winterton. Here and further south in Suffolk they show comparatively little disturbance. They are false-bedded, they contain much coal-smut or comminuted fragments of lignite, and sometimes grains of chalk. At Caister, near Yarmouth, and again at Billockby and other places, many species of shells have been recorded by S. V. Wood, jun., and Mr. F. W. Harmer, who regarded them as belonging to the deposit, and to a comparatively mild Interglacial period. It is, however, much more probable that the bulk of the shells, which are worn and fragmentary, were derived from the Crag.¹

Pebble-beds are met with occasionally in the sands, as near Chedgrave, north of Loddon, Heckingham and Haddiscoe.

Sometimes the sand is indurated. This happened at Mackie's Nursery, near Norwich, from the infiltration of water charged with carbonate of lime from the overlying Boulder Clay. The sand was cemented with the calcareous matter, and was in old times locally used as a building-stone.

Occasionally we find coarse gravel under the Boulder Clay, as at Ashwell Thorpe, and also at Roydon, near Diss, where many derived Jurassic and other fossils have been found. This gravel may be regarded as a torrential deposit, formed by the melting during its earlier stages of the ice-sheet which formed the Chalky Boulder Clay.

The gravels and sands yield water locally, upheld by the Lower Boulder Clay or by the loams of the Contorted Drift. At Holt copious springs are thrown out beneath the gravels and sands which form the plateau above the marly Contorted Drift. At Costessey, St. Walstan's Well was in old times a famous healing spring, and this issues from the Glacial sands.

Many of the springs along the Cromer coast are ferruginous, their courses being marked by dark red stains on the cliff faces.

A good deal of ochreous matter locally occurs in all the gravels of Norfolk, and the Rev. A. R. Abbott found slag in the hollows known as Weybourne Pits, which he attributed to early British workings for iron ore. Iron slag also occurs on Beeston Heath, but Mr. C. Reid considered that the ore might possibly have been brought.

Bog iron ore occurs in some of the valley gravels; and it may be mentioned that iron-pan, a term applied to cemented layers of sand and gravel, is met with at various horizons and localities.

Here and there beneath the Chalky Boulder Clay there are beds of finely laminated loam similar in character to those before noticed in the midst of the Lower Boulder Clay. Some of these masses are remarkably contorted, as may be seen near Diss railway-station. At Hedenham there was formerly a Roman kiln where the loam was worked.

¹ See H. B. Woodward, 'Glacial Drifts of Norfolk,' *Proc. Geol. Assoc.*, vol. ix. p. 113.

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Prior to the deposit of the main mass of coarse gravels there was spread over the greater part of Norfolk an accumulation known as the Chalky or Upper Boulder Clay, a tough unstratified deposit. Like the Lower Boulder Clay, or Till, it contains much Chalk, in the form of pellets and striated pebbles, and little worn flints, many of which are themselves striated. It contains fewer igneous erratics than the older drift, but more Jurassic and Cretaceous detritus; masses of Kimeridge shale with fossils, and fossils of Corallian, Oxfordian and Liassic ages, as well as Red Chalk, Carstone and other Cretaceous rocks. Blocks of Carboniferous Limestone are likewise found, and from the formation in general a good series of British rocks and fossils might in time be collected.

The agent which spread this Chalky Boulder Clay eroded here and there deep channels, along which the present streams have re-excavated courses, or it filled ancient valleys effacing the old scenery, valleys which have now and again been re-excavated.

Mr. C. Reid, in 1880, showed that the contorted beds were in all probability due to the pressure of the ice-sheet during the greatest intensity of cold, at which time by impinging against old cliffs or escarpments of Chalk great masses of the rock were disrupted and incorporated in the Contorted Drift. Boulders of Chalk in every stage of manufacture were thus found, none of them having been moved more than a few hundred yards. The disturbed Chalk at Trimingham, where the Chalk is bent into a loop, the apex of which has been squeezed into the Glacial Drift, tells of the near formation of one of the huge boulders. It is indeed by no means certain that this is not a detached mass, notwithstanding that the Chalk is exposed for a certain distance along the foreshore. Again at Trowse, near Norwich, Glacial drift was found beneath the uptilted Chalk, which dipped at an angle of about 35° .

On the borders of Chalk valleys near coverings of Boulder Clay, we constantly find evidence of glaciated Chalk, where the undisturbed Chalk gradually merges up into Chalk with shattered flints and much earthy material. Occasionally remains of mammoth and red deer have been found in the disturbed Chalk, and a glaciated tooth of mammoth has been obtained from the Drift at Witton, near Bacton.¹

Contortions indeed occur beneath the Chalky Boulder Clay whatever may be the formation on which it rests, whether Chalk or Crag or earlier Glacial Drift. Thus in the Chalk and Crag at Whitlingham, a saddle-shaped disturbance was at one time to be seen, and again at Litcham another instance of superficial disturbance was described by S. V. Wood, jun.

In addition to the large masses of Chalk in the Boulder Clay there are occasional large boulders resembling the Spilsby Sandstone (Neocomian) of Lincolnshire. One of these, known as the Merton boulder, lies on the estate of Lord Walsingham. Another remarkable boulder of Kimeridge Clay was observed by Mr. Reid at Fodderstone Gap, between

¹ See H. B. Woodward, *Quart. Journ. Geol. Soc.*, vol. xlix. p. 146 (Proc.), and Address, *Trans. Norfolk Nat. Soc.*, vol. v. p. 353.

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Shouldham and South Runcton. A brickyard showed 15 feet of Kimeridge Clay, and a well proved the clay to be 50 feet thick and to rest on Lower Greensand.

It may be observed that ordinary Chalk weathers at the surface into a kind of rubble. No doubt when the ice-sheet was forming over the district much of this rubbly Chalk was frozen to its base, and thus were incorporated in the Boulder Clay numerous pellets and tiny boulders of Chalk, which during the movement of the ice-sheet would become scored by pressure against tiny fragments of flint along the shearing planes of the ice.

The Chalky Boulder Clay spreads in a tolerably connected mass over the low plateau of South-east Norfolk. In these tracts it is a much more tenacious clayey drift than it is in West Norfolk, where it is not only less continuous but is thinner and the soil is more marly and sandy, and forms large heaths and warrens.¹ There sand-storms occur after dry weather, when strong winds arise, and the soil is blown away from the surface. The heaths between Watton and East Harling which extend to the south-west from Croxton to near Thetford, form what is known as the 'Breck district.' Here the Chalk is thinly covered by Boulder Clay, and the whole has been sprinkled over with sand, for the most part wind-drifted. As Henry Stevenson remarked, the 'brecks' include tracts which have been 'broken up' by the plough at one time and afterwards abandoned as arable ground, but the district also includes extensive areas which have never been cultivated.² The sand is derived partly from patches of drift sand found here and there on the Boulder Clay and Chalk, and partly from the decomposition of the sandy Boulder Clay.

A remarkable sand-storm occurred in 1668 on the Suffolk borders, at a place called Santon Downham,³ and much of the sand at that time spread into Norfolk.

Wherever the Chalky Boulder Clay occurs there are found in almost every field evidences of old 'marl pits,' now usually ponds. In some of the large fields two or more of these excavations may be found. Some, like the Brooke meres, may have been excavated for other purposes as reservoirs of water for cattle, or even for the human population. The Boulder Clay itself weathers into a brown stony loam, and this decalcified Boulder Clay, which rests on a piped surface like that of the Chalk, is occasionally dug for brick-making, as at East Rudham and Harpley. It is conspicuous again near Burlingham and Lingwood. A Roman kiln found at Kirby Cane, indicates the early working of one of the deposits.

Apart from the surface brickearth the Boulder Clay has been largely used for the manufacture of 'clay-lumps,' rectangular blocks of clay, well worked up with chopped straw and made in moulds 18 inches long by 9 inches wide and 6 inches thick. Then dried in the sun the clay-lumps

¹ See F. J. Bennett, 'Geology of Diss,' (*Geol. Survey*), p. 14.

² Stevenson, *Birds of Norfolk*, vol. i. p. li.

³ F. J. Bennett, 'Geology of Attleborough,' etc. (*Geol. Survey*), 1884, p. 15; and 'Geology of Diss,' etc. (*Geol. Survey*), 1884, p. 5.

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are used not only for building hovels with the aid of a mortar of moist clay, but they are used with advantage in dwelling houses, as when faced with bricks the thick walls make a dry house, cool in summer and warm in winter. The stones in the Boulder Clay are sometimes used for road-mending in areas where gravel is scarce.

The presence of lignite or bituminous shale in the Boulder Clay has led at times to fruitless searches for coal, as near Framingham Pigot.

Water is sometimes obtained from sandy and gravelly seams and beds in the Boulder Clay, and occasionally it is of an artesian character, being pent up beneath the clayey drift.

A petrifying spring, deriving its calcareous matter from the Chalky Boulder Clay, occurs at Burgh Apton, and a mineral water has been advertised as the Shelfanger Spa, near Diss. The more clayey varieties of the Chalky Boulder Clay form the heavier lands of Norfolk; the strong loam or 'clay marle' of Hethel, Mulbarton, Long Stratton, Pulham and Tivetshall (where the clay is from 50 to 90 feet thick). Beans and wheat are cultivated with advantage, while primroses flourish in the banks and line the ditches. Much of the country has a park-like aspect owing to the strong well-timbered hedgerows, the broad strips of grass land which border the roads, and the numerous greens and commons.

It is by no means easy to separate the gravels and sands known as Plateau Gravels from the sands and occasional gravels which underlie the Boulder Clay, and have been termed Middle Glacial. The two groups come together near Cromer in the sand and gravel hills which extend from Paston to Weybourne and Holt, where they form a bold and picturesque range of hills bordering the sea. Here the coarser upper gravel cuts into the lower sands in places. They form the wooded ground, occupied mostly by fir plantations at Felthorpe and Horsford; and in West Norfolk they constitute heathy tracts, rabbit-warrens, and sheep-walks. Some of the gravels contain large rounded flints about the size of old-fashioned cannon balls, and were termed 'cannon-shot gravels' by S. V. Wood, jun. These are the gravels which have been extensively dug on Mousehold, and were formerly used for paving streets in Norwich where they are still known as cobbles or 'petrified kidneys.' Occasional Paramoudras occur in these gravels, and they contain many flint-casts and moulds of Chalk fossils.

The boulder-gravels occur at Poringland and Strumpshaw, at Tharston Furze Hill, Hapton and Wymondham, at North Elmham, Tatterset, Hempton Common near Fakenham, Syderstone and Docking.

Near Docking the gravel contains hard chalk as well as flint, and blocks of it cemented by iron-oxide have locally been used for building. In many of the localities the flint boulders have been used for building-purposes. The round church towers of Norfolk were mostly built of such materials, there being little or no freestone in the county suitable for corner-stones.

These coarse gravels probably resulted from the melting of the ice which brought the materials of the Chalky Boulder Clay. The gravels

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were here and there laid down before the final melting away of the ice, but for the most part they appear to have been due to the torrents thus caused. Hence they may truly be regarded as Flood Gravels and their formation may have initiated some of the main lines of drainage which they partially occupy. They contain no contemporaneous fossils, if we except the broken molar of an elephant mentioned by Mr. Reid.¹

Occasionally these gravels occur in curious isolated sinuous ridges or they appear like 'barrows'; such features having resemblances to eskers have been noticed near Blakeney and also near Ringstead St. Peter.

Loam, perhaps newer than the Chalky Boulder Clay, occurs locally; the more noteworthy deposits being at Holkham and Burnham Overy, and along the margin of the alluvial tracts at Brancaster and Hunstanton. Here there is a brown loam with a few stones, 8 feet thick at the Cliff Gardens, Hunstanton, which has been compared with the Hessle Clay of Holderness. Although some of the loams may simply be decalcified Chalky Boulder Clay, it is probable that all are not of this character.

Possibly of the same age as this Brown Boulder Clay is the marine gravel known as the 'Raised Beach' at Hunstanton. Near the gasworks there is a pit showing about 30 feet of sand and coarse gravel, with streaks of clay and pebbles of hard white Chalk, Red Chalk, and various erratics. It rests on a bed of seemingly rearranged Boulder Clay, and it contains examples of common living species of *Ostrea*, *Macra*, *Cyprina*, *Tellina*, *Purpura* and *Cardium*.

The several divisions of the Glacial Drifts have now been described, and it will be readily admitted that they form a complex group. No section is known which, in one exposure, exhibits all the divisions in succession; but by carefully studying the evidence furnished by cliff-sections and pits, and elsewhere by well-borings, such as those at Dereham, North Walsham, etc., we may obtain a good idea of the relations of the beds. We shall also learn that there are many exceptions to orderly sequence, the result partly of irregular accumulation, partly of subsequent disturbance. We should also be prepared to admit that during the Glacial Period, while land-ice exercised the most potent influence, there were periods when floating ice and coast ice may also have taken a share in the production of the phenomena.²

VALLEY GRAVEL AND LOAM

The deposits of valley gravel and loam in Norfolk do not occur over very extensive areas, excepting near Narborough and along the Fenland borders south of Lynn. They fringe the rivers at a higher level in their valleys than the alluvium, but are not always clearly to be separated from bordering tracts of Glacial gravel.

¹ *Geology of Cromer*, p. 94.

² A capital 'Bibliography of Norfolk Glaciology, including the Cromer Cliffs, with the Forest Bed Series,' by W. Jerome Harrison, was printed in the *Glacialists' Magazine* for 1897. It includes brief abstracts of the papers.

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In West Norfolk the most notable deposit is the Nar Valley brick-earth, to which attention was drawn by C. B. Rose in 1835. It is an estuarine deposit of blue clay containing remains of *Elephas* (mammoth), *Rhinoceros antiquitatis* and red deer; also *Aporrhais pes-pelican*, *Turritella terebra*, *Scrobicularia plana*, *Tellina balthica* and *Ostrea edulis*. It occurs in places as much as fifty feet above the level of the marshes, beneath layers of valley gravel, and it extends down to the marsh level, indicating former submergence and subsequent upheaval. The clay was at one time worked for brick-making, and the shelly beds were put on the land as 'marl.' An interesting deposit of freshwater marl and silt also occurs at Gayton Thorpe.

In the valleys of the Waveney, Yare, Wensum and Bure there are here and there tracts of valley gravel, as near Thorpe Station, Norwich. On the whole but few organic remains have been obtained from these accumulations. Remains of mammoth and other extinct mammalia have been recorded from some localities, but it is not clear that all the valley gravels are of an age to yield the mammoth.

At Mundesley an old river-bed of Pleistocene age was described by Lyell and Prestwich. It comprises deposits of gravel with an intercalated bed of peaty loam, altogether 45 feet thick. In the loam plant remains, shells such as *Hydrobia marginata*, and elytra of beetles have been obtained. Remains also of *Elephas antiquus*, *Cervus* (*Megaceros*) *giganteus* and *Emys orbicularis* have also been found.¹ The occurrence of the freshwater tortoise is remarkable, as remains of that reptile were previously discovered in a peat bog at East Wretham, where the deposits would naturally be regarded as far more recent than those at Mundesley.² On this subject further light is needed, although Professor A. Newton has observed that remains of the tortoise have been found in peaty deposits in Denmark and Sweden.

The depth of the alluvial deposits in some of the old valleys shows that they are now much below the sea-level, so that the land in these comparatively recent times must have been much higher. Thus at Norwich the depth was proved to be 42 feet, at Potter Heigham 56 feet, and at Wroxham 72 feet. It seems probable that the land was higher in Pleistocene times, for the Dogger Bank is a remnant of old Pleistocene deposits; as Mr. Reid suggests, a re-extension of the old Rhine estuary. It is a shoal under 10 fathoms, and about 120 miles north-north-east of Cromer. Many mammalian remains dredged up by fishermen have been obtained from this bank, and they indicate in general a deposit of the age of the Thames Valley gravels.³ It must however be remembered that specimens from various geological horizons and from different portions of the North Sea bed are dredged up, and

¹ E. T. Newton, 'Note on some Fossil Remains of *Emys lutaria* from the Norfolk Coast,' *Geol. Mag.*, Dec. ii. vol. vi., 1879, p. 304.

² A. Newton, 'On the Zoology of Ancient Europe,' *Proc. Cambridge Phil. Soc.*, 1862; and *Ann. Nat. Hist.*, ser. 3, vol. x., 1862, p. 224.

³ Reid, *Geology of Cromer*, p. 122; W. Davies, *Geol. Mag.*, Dec. ii., vol. v. pp. 97, 443.

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thus the evidence of particular specimens must be received with caution.

The occurrence of Palæolithic implements is always of interest. In Norfolk an implement was found in 1865 at Redhill, near Thetford, and others subsequently were obtained at Shrub Hill Farm, on an islet of gravel in Feltwell Fen, $3\frac{1}{2}$ miles south-west of Feltwell. In the Little Ouse valley at Brome hill, or Broomhill, in the parish of Weeting, north-east of Brandon, implements have been found; one was obtained in the Yare at Cringleford by Mr. F. W. Harmer; and others have been met with in the Waveney valley near Bungay, and by Mr. A. C. Savin in the valley gravel at West Runton.

It should also be mentioned that Mr. W. J. L. Abbott recorded worked flints from the Cromer Forest Bed Series at East Runton, but Sir John Evans has failed 'to see any distinct marks of human workmanship upon his specimens.'¹

A Palæolithic implement was recorded from the coarse gravels at Wells, in which remains of mammoth have been found. The gravel here is not unlike some of the coarse Plateau Gravels, but may be of later date.

The older coarse gravels, as well as those of later date, were utilized by the Palæolithic men, as many implements in the Little Ouse valley were fashioned from worn flints and some from Carboniferous sandstones and grits.

ALLUVIUM

The alluvium itself comprises a variety of deposits; mud and silt, shell marl, peat and gravel; and in it are found remains of *Castor fiber* (beaver), *Bos taurus* (*primigenius*), the so-called *B. longifrons*, *Cervus giganteus* (Irish elk), *Capreolus vulgaris* (roe deer), *Cervus elaphus* (red deer), *Sus scrofa* (boar), as well as goat and sheep.

Rangifer tarandus (reindeer) has been recorded from Feltwell and East Bilney; and *Cervus dama* (fallow deer) from Brancaster. Fresh-water shells, hazel nuts, etc., locally occur in the alluvial deposits.

The alluvial clays have been used for brick-making in the Fenland, also near Castle Rising, and occasionally at other localities.

Peat has been dug in the Fenland, and it was observed by Mr. S. B. J. Skertchly,² that no village was situated on the peaty areas, as the foundations would not permit of it, the few houses being supported by piles driven deep into the clay below. The areas of silt and gravel are marked by numerous villages. Peat has been dug for fuel, on a small scale, in many other parts of Norfolk.

The Fenland itself is mostly below the level of high water, and comprises varied deposits of dark clay, silt and peat, altogether about 40 feet thick, and resting on the Jurassic clays. The Fenland clays

¹ *The Ancient Stone Implements, Weapons and Ornaments of Great Britain*, ed. 2, 8vo, London, 1897, pp. 550, etc.

² See 'Geology of the Fenland' (*Geol. Survey*), 1877; and S. H. Miller and S. B. J. Skertchly, 'The Fenland Past and Present,' 1878.

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and silts are mostly marine or estuarine, and as Mr. Skertchly has pointed out, there is every gradation from the 'buttery clay' (as it is called) to silt. The clays contain woody fragments with vivianite (phosphate of iron), and there is usually at the base a floor of sand and gravel with marine shells. The fossils contained in these deposits are the familiar estuarine forms, such as *Scrobicularia plana* (*piperata*), *Tellina balthica*, *Cardium edule*, *Ostrea edulis* and *Mytilus edulis*, many of them dwarfed. In addition we occasionally find bones of animals such as are found in the alluvium, and also remains of whale, grampus and seal.

The peat contains trunks of trees, remains of 'buried forests,' which are usually found near the borders of the Fenland or around islands in the levels.

The Fenland area was once an arm of the sea, the materials were mostly brought in by the sea, and the silting up has long been going on.

Formerly a morass, with here and there extensive pools of water, the Fenland has been greatly modified by the works of man. Portions of it were embanked and drained by the Romans; but after their departure the sea returned, and large tracts were covered with beds of marine silt. These areas have again been reclaimed and converted into productive lands. In some places a breadth of three miles has been gained since the Roman occupation.

The scenery is naturally monotonous, but it has its own peculiar charms, although, with the exception of the willows and aspens which fringe the watercourses, there are few trees.

The Lynn Deep, in which are channels over five fathoms deep in the middle of the Wash, may have been scooped out of the clayey deposits by tidal action; but in Mr. Jukes-Browne's opinion the scour of the tides may have operated on an ancient valley formed by the old Fen rivers. This subject may be studied with reference to the deep alluvial valleys in East Norfolk, previously mentioned. In these old times the Fen rivers may have joined the Rhine estuary, and the marshlands in north Norfolk may be remnants of the old alluvial valley in Pleistocene times.

On the foreshore north-west of Old Hunstanton and Holm, and at low-water level between Hunstanton and Brancaster, there are traces of a 'submerged forest,' equivalent probably to one of the peaty layers and buried forests in the Fenland. Oak, elm, birch and yew, willow and sallow have been found in this peaty deposit, the roots being fixed in the bed underlying the peat.

Some of the alluvial tracts near Wells, Stiffkey and Morston, are known as salt marshes, as they are liable to be flooded at high tide, which is not the case at Brancaster, Burnham and Cley, where the marshes are protected by embankments.

BLOWN SAND

The marshes on the north coast of Norfolk, as well as those bordering the Hundred stream and the Bure, near Breydon Water, are

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protected by the ranges of blown sand, known as Meals, which rise from a few feet to 50 or 60 feet in height, and present a mountainous outline when seen from a distance, especially at sunset. They fringe the coast near Brancaster, the Burnhams, Holkham and Wells, and extend from Eccles and Waxham to Winterton, East Caister and Yarmouth.

The blown sand is mainly derived from the expanses of sand which are uncovered on the foreshore at low tide, but in some places the accumulation is helped by the sand blown away from the cliffs.

From the fact that the hills were planted with the marram grass they are known as the Marram Hills.

MODERN CHANGES

The outline of the coast is unbroken by any great bays, if we except a portion of the Wash. The one rocky cliff of Hunstanton, which rises to a height of 68 feet, has protected the north-west corner of Norfolk. Elsewhere along the coast the irregularities marked by the names of Brancaster Bay, Holkham Bay and Blakeney Harbour, are indentations in the sandy foreshore protected by blown sand and spits of shingle.

At the mouth of the Great Ouse, at Lynn, and at the mouth of the Yare, at Yarmouth, where the united waters of the Waveney, Yare and Bure help to scour out a channel, we have the only two harbours of consequence in Norfolk. The harbours of Wells, Blakeney and Cley have deteriorated since the reclamation of the marshlands.¹

Among the beach deposits that of Weybourne, which stretches in a west-north-west direction from Weybourne for ten miles to the mouth of Blakeney Harbour, is of interest. The stones do not exhibit any gradual variation in size like those in the Chesil Beach. They consist mostly of flint, but include quartz, jasper, agate, carnelian, quartzite, and other rocks derived from the Glacial Drifts in the Cromer cliffs. The general movement of the beach is westward. On the east coast the shingle and sand travel southwards, and the mouth of the Yare has been constantly forced in that direction owing to the growth of sand and shingle which has formed a great natural embankment between the sea and the marshlands from East Caister southwards for about five miles. As remarked by Mr. J. B. Redman, this great area, 'equal to 1,600 acres, has been formed across what was a large estuary during the occupation of the country by the Romans.' After A.D. 1000 this bank became sufficiently sound for a settlement to be made on it, and the present town of Yarmouth was founded. It was then separated from Caister by a channel called Grubb's Haven, which was closed about the reign of Edward III. When the channels at the mouth of this estuary became choked, the influx of the tide became more and more restricted, the rivers in the drier seasons occupied but narrow channels, and these in course of time were embanked and the marshes for the most part became dry land.

¹ *North Sea Pilot*, part iii. p. 143. See also J. B. Redman, 'The East Coast between the Thames and the Wash Estuaries,' *Proc. Inst. Civ. Eng.*, vol. xxiii., 1865, p. 186.

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Irregular hollows of the old estuary however remained and held great sheets of water, some of them in the direct course of the rivers, others isolated from them, and only connected by narrow artificial channels called 'gatways.' These are the Broads which form such picturesque features in East Norfolk. They vary in size from small pools or 'pulks' to sheets like that of Wroxham covering 92 acres, and Hickling 578 acres. All appear to be slowly filling up and contracting by the mud brought down by the rivers, by peaty accumulations, and by the growth of reeds and rushes along their borders.

The tide now flows up the Waveney as far as Shipmeadow Lock (27 miles), up the Yare to Norwich (29 miles), and up the Bure to Wroxham (25 miles). Higher up the streams are navigable by means of locks. The artificial hindrances to the flow of the streams have, in times of long continued and heavy rain, led to disastrous floods, such as that which occurred at Norwich and elsewhere in the county in 1878.

Comparatively little erosion now appears to be taking place along the river valleys. The rivers have reached their base-level, and the tributary streams alone are able to deepen their courses. As Mr. Reid has remarked the waste of the coast-line has undoubtedly curtailed the drainage areas of some of the rivers, especially that of the Bure, and consequently the waters have become more sluggish.¹

The boundary between Norfolk and Suffolk is marked by the courses of the Waveney and Little Ouse; and it is a remarkable fact that both rise near together at South Lopham, in a sandy tract intersected by dykes. A 'causeway' about 86 feet above sea-level now forms the division between the two drainage areas.

If the rivers now appear to exercise but little influence on the waste of the land, this is not the case with the sea.

The waste of some portions of the Norfolk coast has attracted a good deal of attention, but there are compensations in the growth of land on the Fen margins, in the heaping up of blown sand which has been banked up against the old cliff south of Winterton, and in the growth at Yarmouth.

The cliffs elsewhere between Happisburgh and Weybourne waste away at a rate estimated at from two to three yards a year, so that two or three miles may have been lost since Roman times. Since the Norman period, indeed, several villages, Shipden, Wimpwell, and great part of Eccles-next-the-Sea, have been washed away. The waste is accelerated by landslips which occur along the coast, the irregular accumulation of contorted loam and clay with basin-shaped hollows of sand and gravel being peculiarly susceptible to the influence of springs which loosen and undermine the strata.

Mud streams are also a noticeable feature along the coast; while the wind, as before-mentioned, lends its aid in the destruction. Then the sea washes away the tumbled material and the coast is ready for

¹ Reid, *Geology of Cromer*, p. 131; J. H. Blake, 'Geology of Yarmouth,' etc. (*Geol. Survey*), 1890, pp. 62, 73.

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further slips. The beach deposits are nowhere very thick below the cliffs, and at various places they are now and again cleared off after heavy gales in some places and heaped up in others.

The old church of Eccles-next-the-Sea, rendered famous by the descriptions of Lyell, must originally have been built in an alluvial valley separated from the sea ; it gradually lost the protection of higher ground, and was in 1839 surrounded by blown sand. Since that date the blown sand shifted inland and the round church tower for many years stood lonely on the foreshore several yards from high-water mark. In January, 1895, the tower was destroyed during a violent storm.

CONCLUSION

These evidences of destruction in one place and of accumulation in another are but continuations of geological history which tells of constant change.

The strata of which we have evidence in Norfolk present to us all conditions from that of deep sea to shallow sea, and all climates from that of tropical to arctic.

The present inland features are due mainly to the influence of rain and rivers subsequent to the great Ice Age. The melting of the ice which formed the Chalky Boulder Clay doubtless produced torrential streams which marked out some of the main lines of drainage, and the ordinary action of rivers carried on the work during the succeeding milder epoch which links on to the present. The land stood higher and extended much further, and the rivers had longer courses and greater falls.

The passing away of the icy conditions left a great plain whose surface was formed partly of gravel and sand, partly of loam and Boulder Clay, and partly of Chalk and older strata. On such a varied platform the action of subaërial forces would vary, as rain sinks into porous strata, but directly erodes impervious deposits like clay. Beneath sheets of gravel overlying clay, the waters collect and issue where they can along the valleys. Subterranean watercourses no doubt exist beneath sheets of sand and gravel, as is evident from the permanency of certain springs. They flow along definite courses marked out on the floor of clay and must cause some subterranean erosion. Their courses may be indicated by slight sinking of the ground, and eventually patches and outliers of gravel become separated from the main mass. In this way may we account for some of the many gravel hills scattered over the clayey and marly regions, as near Holt.

Evidence of man's existence during the formation of some of the earlier valley-deposits has been proved by the occurrence of Palæolithic implements. Many and great changes have taken place since then ; and we can only surmise that the present features had been mainly formed when his Neolithic and other pre-historic successors occupied the country.

In some counties where there are broad alternate bands of impervious

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and porous strata the position of the villages is seen to follow the definite outcrops of water-bearing formations. In Norfolk springs and water-bearing beds occur throughout the county, and excepting on the larger areas of stiff Boulder Clay, south of Loddon, Hempnall and Long Stratton, where apparently few old settlements took place, we can discern no particular system in the positions chosen as sites for villages. The variety of the soils in Norfolk, and the absence of any mineral products, has naturally caused agriculture to be the chief industry of the population, while the extensive sea-coast has further induced many to follow the trade of fishing.

In conclusion it may be observed that while a charm is found in the effort to decipher the stony records of our highest hills and mountains, when as a rule we are brought into contact with the earlier pages of geological history, we may find no less interest and charm in studying the lowlands in which for the most part we read some of the later pages of geology and are brought more directly in contact with the early history of man, and with the origin of the existing fauna and flora of the country.

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TO the student of the past history of vertebrate animals Norfolk is an area of especial interest, on account of the numerous remains of mammals buried in the so-called Forest Bed and the underlying Norwich Crag, both of which deposits are almost restricted to the county. Vertebrate remains also occur in certain more superficial deposits in the county, such as those of the old river valley at Mundesley, as well as in the peat of the fens.

With regard to the remains from the peat of the fens, with the exception of the giant Irish deer, these belong entirely to species still existing, although several of them have long since been exterminated from Britain, while the aurochs, or wild ox, is now represented only by its degenerate domesticated descendants. Of species still existing in the county it will be unnecessary to say anything. The exterminated mammals which have left their bones in the peat include the wolf (*Canis lupus*), the brown bear (*Ursus arctus*), the beaver (*Castor fiber*), the wild boar (*Sus scrofa ferus*), the aurochs (*Bos taurus primigenius*), and the reindeer (*Rangifer tarandus*). Whether all these have been actually found in the Norfolk fen deposits it is not easy to ascertain, although they certainly occur in those of the adjacent county of Cambridge. A splendid skull of the reindeer was, however, disinterred many years ago from the peat of Bilney Moor near East Dereham. The late Sir R. Owen recorded remains of the beaver at the base of the peat at Hilgay; with these were also found bones of the giant Irish deer, or 'elk' (*Cervus giganteus*), the typical race of which appears to have been unknown at the epoch of the Forest Bed. The fens also yield remains of the Celtic shorthorn, which seems to have been a domesticated breed of cattle; while antlers and bones of the red deer (*Cervus elaphus*) and the roe (*Capreolus vulgaris*)—both species which have long since disappeared from the county—are likewise met with. Very interesting is the occurrence in the peat of the Norfolk fens of a wing-bone of a pelican apparently nearly allied to the South European species.

From the Mundesley river bed, which occupies a trough cut in the lower portion of the glacial deposits, there was obtained some years ago an imperfect shell of the European pond tortoise (*Emys orbicularis*), the specimen in question being apparently the only evidence of the former existence of that reptile in Britain. Bones of the red-throated diver (*Colymbus septentrionalis*) have likewise been obtained at Mundesley.

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Remains of the ordinary Pleistocene mammals are met with in some of the gravels and glacial deposits of Norfolk, but since they are inferior in interest to the preglacial animals found in the county, a detailed notice may be dispensed with. It may, however, be mentioned that an imperfect molar of the mammoth (*Elephas primigenius*) was discovered many years ago in chalk débris at Horstead, and is noticed in Woodward's *Geology of Norfolk*. Teeth and tusks of the same animal are also not unfrequently dredged up from the Knole Sand off the coast at Happisburgh, as well as at other localities in the county; and, indeed, are likewise hauled up in the nets of fishermen trawling on the Dogger Bank. Molars of the woolly rhinoceros (*Rhinoceros antiquitatis*) are likewise dredged on the Dogger Bank, and it would seem probable that some of the rhinoceros remains obtained from time to time off Happisburgh are referable to the same species, although at least several of those in the British Museum from that place belong to *R. etruscus* of the Forest Bed. Teeth and bones of the hippopotamus also occur among the specimens dredged off Happisburgh.

Passing to the preglacial Forest Bed, we have first of all a species of sabre-toothed tiger (*Machærodus*) represented by a lower jaw from Kessingland, and likewise by an imperfect specimen of one of the huge upper tusks from which this extinct genus was named. The large Pleistocene variety of the African spotted hyæna (*Hyæna crocuta spelæa*) was at this time an inhabitant of Norfolk, its remains having been discovered at Corton, Kessingland, and Cromer. Teeth and bones of the wolf (*Canis lupus*) have likewise been found at Kessingland, Overstrand, and Runton. Probably the fox (*C. vulpes*) was likewise a member of the Forest Bed fauna, although this is not absolutely certain. Other Forest Bed Carnivora are the marten (*Mustela martes*), of which remains occur at West Runton; the Arctic glutton, or wolverine (*Gulo luscus*), as represented by a lower jaw from Mundesley; and the otter (*Lutra vulgaris*), of which a jaw has been obtained at East Runton. The list of named species of Forest Bed land Carnivora closes with the great extinct cave bear (*Ursus spelæus*) and the brown bear (*U. arctus*); the remains of the latter species being possibly referable to one of the American races, such as *U. arctus horribilis*, although considerations of geographical distribution are somewhat against such a reference. The marine Carnivora are represented in these deposits by a tooth and one of the bones (radius) of the fore-arm of an undetermined species of seal from West Runton, as well as by the bone of the upper arm (humerus) of the bearded seal (*Phoca barbata*) from Overstrand. There is also an extinct walrus (*Odobænus huxleyi*).

It was at one time considered probable that the aurochs lived in Britain at the time of the deposition of the Forest Bed, but all the specifically determinable remains of oxen from that formation are now definitely known to belong to the Pleistocene representative of the bison (*Bos priscus*). An imperfect skull of the musk ox (*Ovibos moschatus*) obtained at Trimingham, and formerly in the collection of the late

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Rev. F. Buxton, is believed to have come from the Forest Bed ; while the same origin is attributed to a specimen preserved in the Cambridge Museum which appears to have been dredged from the North Sea. Whether or no either or both of these skulls really came from the Forest Bed, they indisputably serve to indicate the occurrence of the musk ox (which is now restricted to Greenland and Arctic America) in East Anglia at or about the time when that formation was deposited. An imperfect skull of a sheep from Overstrand, now in the collection of the British Museum, indicates a species apparently allied to the living Asiatic mutton (*Ovis orientalis*) of Asia Minor. Antlers and other remains of deer are of exceedingly common occurrence in the Forest Bed, but a great number of unnecessary species have been made upon the evidence of these remains, which are for the most part in a very imperfect condition. One very well characterized form is the Forest Bed elk (*Alces latifrons*). The modern red deer (*Cervus elaphus*) was also in existence at the epoch in question, as is attested by well-preserved specimens of the antlers from the peaty bed at Kessingland. A fallow deer is also indicated by antlers from the Forest Bed to which the name *Cervus savini* has been applied ; but it seems very doubtful whether this animal is really separable from *C. browni*, previously described from the superficial deposits of Clacton in Essex. Upon the evidence of more or less imperfect antlers of different ages a number of nominal species of Forest Bed deer, such as *C. verticornis*, *C. gunni*, *C. fitchi*, and *C. darwinski*, have been described ; but these are now ascertained to belong to a race of the giant Irish deer, for which the proper name seems to be *C. giganteus belgrandi*. Antlers of the roebuck have been recorded from the superficial deposits of the Norfolk coast, but there is some degree of doubt as to their being from the Forest Bed. Very remarkable are the two deer from the Forest Bed and the Upper Pliocene deposits of the Continent now known as *Anoglochis sedgwicki* and *A. tetraceros*. In both the antlers resemble those of the American deer of the genus *Mazama* in the absence of a brow-tine and the dichotomous forking of the beam ; those of the species first named being remarkable for their size and complexity, whereas those of the latter are simpler and have but five tines. This by no means exhausts the list of deer which have been named from the Forest Bed, although all the well-defined types have been mentioned.

Remains of the Pleistocene race of the hippopotamus (*Hippopotamus amphibius major*) were recorded so long ago as 1833 by Dr. S. Woodward in his *Geology of Norfolk*, and other specimens have been obtained subsequently. Teeth and other remains of the wild boar (*Sus scrofa ferus*) likewise occur in the same deposits. Teeth of the wild horse (*Equus caballus fossilis*) are also met with in the Norfolk Forest Bed, as are those of the extinct Continental Pliocene species known as *E. stenonis*. Although the woolly rhinoceros seems to have been unknown at this epoch in Britain, the genus is represented in the deposits under consideration by Falconer's rhinoceros (*Rhinoceros etruscus*), an extinct species first

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described from the Upper Pliocene beds of Italy, and easily distinguishable by the low crowns of its cheek-teeth. Remains of extinct elephants occur abundantly in the Norfolk Forest Bed, although there is no evidence that any of these are referable to the mammoth, which is so common in the more recent deposits. The Forest Bed species are the southern elephant (*Elephas meridionalis*) and the straight-tusked elephant (*E. antiquus*); the former attaining considerably larger dimensions than the mammoth, and having molars with fewer and smoother and more expanded plates of enamel. It is, however, somewhat remarkable that some of the elephant molars from the Forest Bed exhibit characters more or less intermediate between those of the mammoth on the one hand and those of the two species above-named on the other; and there accordingly seems a probability that the evolution of the mammoth may have been in progress during this epoch.

Turning to the smaller mammals, presumptive evidence of the existence of the squirrel (*Sciurus vulgaris*) at the epoch under consideration is afforded by the frequent occurrence of gnawed fir-cones in the Forest Bed; this evidence being supported by the discovery at Ostend, near Bacton, of an arm-bone (humerus) of this species in deposits probably belonging to the Forest Bed group. That the beaver (*Castor fiber*) was a Forest Bed animal is attested by the discovery of its remains previously to 1846, as well as by others obtained at a much later date. Much more remarkable is the extinct Forest Bed beaver (*Trogontherium curvieri*), first known by a specimen from a sandy deposit on the borders of the Sea of Azov, and subsequently recognized by Sir R. Owen from the Forest Bed. Whether the water vole (*Microtus amphibius*) is represented in these deposits is uncertain, but of land voles, or field mice, there occur the bank vole (*M. glareolus*), a variety of the common field vole (*M. agrestis intermedius*), the Continental field vole (*M. arvalis*), and probably the Siberian vole (*M. gregalis*). Remains of the common long-tailed field mouse (*Mus sylvaticus*) have also been obtained at West Runton. The list of small mammals is completed by the mole (*Talpa europæa*), the common shrew (*Sorex vulgaris*), probably the pigmy shrew (*S. minutus*), and the Russian desman (*Myogale moschata*). The occurrence of the last-named long-snouted aquatic species is very remarkable, since it is now restricted to that part of Russia lying between the Don and the Volga; in the Forest Bed its remains have been met with at Bacton, West Runton, and Beeston near Cromer.

Remains of whales and dolphins, so common in the Crag deposits of Suffolk and Essex, are rare in the Norfolk Forest Bed. The occurrence of the sperm whale (*Physeter macrocephalus*) is indicated by a tooth; and a vertebra from near Cromer belongs to a large rorqual, or finner-whale, perhaps indistinguishable from the living *Balænoptera musculus*. Two other vertebræ from East Runton and Pakefield are referable to the killer-whale (*Orca gladiator*), and a fourth, from Mundesley, apparently pertains to the false killer (*Pseudorca crassidens*). Other Forest Bed cetaceans are the Arctic narwhal (*Monodon monoceros*), the

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white whale or beluga (*Delphinapterus leucas*), which is likewise a northern species, the common dolphin (*Delphinus delphis*), probably the bottle-nosed dolphin (*Tursiops tursio*), and the porpoise (*Phocæna communis*).

The list of birds, reptiles, and amphibians from the Forest Bed is but small, and includes none but living species. These are the eagle-owl (*Bubo ignavus*), the cormorant (*Phalacrocorax carbo*), a goose (*Anser*), the shoveler (*Spatula clypeata*), the water-snake (*Tropidonotus natrix*), the viper (*Vipera berus*), the common frog (*Rana temporaria*), perhaps the edible frog (*R. esculenta*), the toad (*Bufo vulgaris*), and the newt (*Molge cristata*).

The fishes include the perch (*Perca fluviatilis*), probably the ruffe (*Acerina vulgaris*), the extinct *Platax woodwardi*, the tunny (*Thynnus vulgaris*), the plaice (*Platessa vulgaris*), the cod (*Gadus morrhua*), probably the barbel (*Barbus vulgaris*), the roach (*Leuciscus rutilus*), the chub (*L. cephalus*), the rudd (*L. erythrophthalmus*), the tench (*Tinca vulgaris*), the bream (*Abramis brama*), the pike (*Esox lucius*), and the sturgeon (*Acipenser sturio*).¹ The land and freshwater shells of the Forest Bed belong to existing species, and include the common pond-mussel (*Anodonta cygnea*), the painter's mussel (*Unio pictorum*), *Pisidium amnicum*, *Corbicula fluminalis*, and species of *Helix*, *Planorbis*, *Valvata*, etc. The marine molluscs, on the other hand, are mostly of an Arctic type, and comprise *Mya truncata*, *Tellina balthica*, *Cardium edule* (cockle), *Leda myalis*, *Astarte borealis*, etc.

In addition to the numerous stumps of trees from which the formation derives its name, plant remains occur commonly in one particular horizon of the Forest Bed; the most interesting being the water-chestnut (*Trapa natans*), a species now quite unknown in a living state in Britain.

The vertebrates of the Norwich and Weybourn Crags are much less numerous than those of the Forest Bed, and, as might be expected, include a larger percentage of extinct types. Among the mammalian remains a tooth from the Norwich Crag at Bramerton, preserved in the Norwich Museum, is believed to indicate an extinct otter, for which the name *Lutra reevei* has been suggested. A thigh-bone (femur) from the Chillesford beds, in the same museum, is referable to the Crag walrus (*Odobænus huxleyi*); and there are indications of a seal. Teeth of some kind of ox are occasionally met with in the Norwich Crag, which has also yielded the remains of an extinct gazelle (*Gazella anglica*). Antlers from the same deposit have been assigned to the Ardé deer (*Anoglochis ardeus*), a species typically occurring in the Pliocene of France; and others have been regarded as identical with that race of the giant Irish

¹ For the vertebrate fossils from the Forest Bed the reader should consult *The Vertebrata of the Forest-bed Series of Norfolk and Suffolk* (1882) and *The Vertebrata of the Pliocene Deposits of Britain*, both by E. T. Newton, and published by the Geological Survey. For a revision of the deer see *The Deer of all Lands* (1898), by the present writer, and a paper by Mr. C. Harmer on *Cervus belgrandi*, published in the *Transactions of the Zoological Society* for 1899.

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deer known as *Cervus giganteus carnutorum*. To others, again, the names *C. suttonensis* and *C. falconeri* have been applied, but their affinities are very doubtful. The horse teeth from the Norwich Crag all belong to the extinct *Equus stenonis*. Somewhat curiously, no remains of rhinoceros have been recorded from these deposits. Teeth of mastodons, or primitive elephants, belonging to the species known as *Mastodon arvernensis* are, however, by no means uncommon in the Norwich Crag; where molars of a true elephant, *Elephas antiquus*, are likewise met with. The molar teeth of mastodons, it may be observed, differ from those of modern elephants by their much simpler structure; their crowns carrying low transverse ridges, sometimes broken up into cones, separated from one another by open valleys, instead of tall and thin plates with the intervening spaces completely filled up. The Forest Bed beaver (*Trogotherium cuvieri*) extends down to the Norwich Crag, as does the Crag variety of the common field vole (*Microtus agrestis intermedius*). The only specifically determined remains of cetaceans found in these deposits within the limits of the county appear to belong to the extinct Crag black-fish (*Globicephalus uncidens*) and the common dolphin (*Delphinus delphis*).

Remains of birds and reptiles are unknown, but a considerable number of those of fishes have been obtained, many of which are common to both the Norwich and the Weybourn Crag. Teeth from Bramerton have been assigned conditionally to the existing genus *Ceratophrys*, while bones of the above-mentioned *Platax woodwardi* are by no means uncommon. Other remains have been assigned to the cod (*Gadus morrhua*), an extinct species (*G. pseudæglefinus*) allied to the haddock, the pollack (*G. pollackius*), a sturgeon (*Acipenser*), and the tope shark (*Galeus canis*), the last-named species being known by teeth from the Weybourn Crag of East Runton. At Thorpe has been obtained a single tooth of a comb-toothed shark (*Notidanus*). Dermal plates of the thornback skate (*Raia clavata*) occur in the Norwich Crag, and teeth of the same species in the Weybourn Crag of East Runton; and an extinct ray (*Rhinoptera woodwardi*) is also represented in the Norwich Crag.

Two bivalve shells very characteristic of the Norwich Crag at Bramerton—the great collecting place—are *Tellina obliqua* and *Nucula cobboldiæ*. The uppermost or Chillesford beds at this locality show a more decidedly northern type of molluscs than do the underlying fluviomarine beds, the commoner species being the bivalves *Astarte borealis*, *A. compressa*, *Corbula striata*, *Cyprina islandica*, *Leda oblongoides*, *Lucina borealis*, and the univalve (whelk) *Baccinum undatum tenerum*. In addition to the above, the lower beds contain the bivalves *Nucula cobboldiæ*, *Tellina obliqua*, *T. lata*, *T. pretenuis*, *Cardium edule* (cockle), *Mytilus edulis* (mussel), *Mactra ovalis*, *M. subtruncata*, *Scrobicularia plana*, *Mya arenaria* (gaper), and the univalves *Littorina littorea* (periwinkle), *Melampus pyramidalis*, *Purpura lapillus* (banded whelk), *Trophon scalariformis*, *T. antiquus* (red whelk), *Turritella terebra*, *Cerithium tricinctum*, *Scalaria*

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grænlandica, *Natica catena*, *N. clausa*, and *Paludina media*. A lamp-shell, *Rhynchonella psittacea*, is of occasional occurrence.

Passing from the Tertiary to the Secondary deposits, the most interesting vertebrate remains from the Norfolk Chalk are teeth of *Liodon anceps*, a large marine lizard-like reptile allied to the well-known *Mosasaurus* of the Upper Cretaceous beds of Belgium. Certain other teeth of the same general type, as well perhaps as vertebræ, may indicate a species of the last-named genus in the Chalk of the county. Vertebræ from the White Chalk have been referred to *Ichthyosaurus campylodon*, and a single tooth of the same genus from the Red Chalk of Hunstanton, preserved in the Woodwardian Museum, Cambridge, has been made the type of an undescribed species, under the name of *I. angustideus*.

Of the cretaceous fishes found in the county, the following are the more important. Firstly, we have a species described as *Cælorhynchus cretaceus*, the exact affinity of which is still uncertain. Teeth of the chimæroid *Edaphodon sedgwicki* occur both in the Upper Chalk of Norwich and in the Red Chalk of Hunstanton. A tooth in the British Museum from the Upper Chalk of Norwich indicates a ray of the genus *Squatina*; and other teeth from the Whittington Chalk in the same collection are referable to the pavement-toothed ray known as *Ptychodus decurrens*. From the Chalk of Swaffham and Norwich have been obtained teeth of a comb-toothed shark, *Notidanus microdon*; and a species of pavement-toothed shark, referable to the existing Australian genus *Cestracion*, also occurs in the Norwich Chalk, as well as one pertaining to the extinct genus *Synechodus*. Of sharks with a more normal type of dentition, the following are represented in the Chalk of the county, viz.: *Scapanorhynchus rhabiodon*, *S. subulatus*, *Lamna appendiculata*, *L. crassa*, *Corax affinis*, and *C. pristodontus*.

From the narrow strip of Kimeridge Clay near Downham Market have been obtained the jaws of a peculiar species of ganoid fish which has been named *Caturus suchoides*, this unique specimen being in the British Museum.

The invertebrate remains from the cretaceous rocks of the county call, as a rule, for no special notice, since they are for the most part identical with those from other districts. An exception must, however, be made in favour of the vertical columns of enormous vase-shaped flints met with at Horstead and certain other quarries in the county, for which the Irish vernacular name *paramoudra* has been adopted. These flints, which vary from two to five feet in height, have been formed by the deposition of siliceous matter on large sponges somewhat resembling the modern Neptune's-cup sponge (*Poterium patera*), as they gradually became buried in the chalk ooze. As one individual became buried, another grew in its place on the ocean floor, thus giving rise to the vertical columns in which the paramoudras occur. Some of these flints are pear-shaped rather than vase-shaped, and are hollow only in the centre. Of molluscs, the commonest in the Chalk at Norwich are two lamp-shells, *Terebratula carnea* and *Rhynchonella plicatilis*.

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It may be added that the Red Chalk at Hunstanton is crowded with fossils, of which there are between fifty and sixty different species. Among these, a stone-lily, *Bourgueticrinus rugosus*, and a lamp-shell, *Terebratula capillata*, are unknown in any other British formation. As common fossils, mention may be made of *Ammonites auritus*, *Belemnites minimus*, *Terebratula biplicata*, and the sponge *Siphonia paradoxica*.



English Miles
0 5 10 15 20

LIST OF BOTANICAL DISTRICTS

I. Eastern

II. North Central

III. South Central

IV. Western

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NORFOLK considered from a physical and also from a botanical point of view is an irregular oval tract of land of 1,291,170 acres in extent, about 65 miles in its greatest length from east to west from Yarmouth to Wisbeach, by about 40 in its greatest breadth from north to south from Blakeney to Bressingham. The two apices of this oval consist of flat alluvial marshy land, the eastern one containing the 'Broads' and the western the 'Fens,' the eastern skirts of the great fens of Cambridgeshire and the Isle of Ely; between these marshes rises a broad wedge of gently undulating country, which nowhere attains a height of 350 feet. Its two highest points are a range of hills between Cromer and Holt on the east and near Massingham on the west. Under nearly the whole, with the exception of its north-west corner, of this central portion of the county lies chalk which sometimes rises so near the surface as to give a calcareous character to the soil, which is otherwise mostly light, sandy, or gravelly, with marshy, peaty accumulations in the beds of the rivers and streams. The rainfall is light, averaging for the last hundred years about $24\frac{1}{2}$ inches per annum. There is rather more than a hundred miles of sea coast, varying from chalk, gravel, or clay cliff, or sandy, stony beach, to salt marsh, much of which is more or less overflowed by the tide.

The enclosure of a large portion of the common and waste land of the county does not date back more than a hundred years, and fortunately much of what is now drained and cultivated was botanized over by keen and skilful observers before its character was changed, as may be seen by reference to the works of the older writers on the British flora, and it is very remarkable how few of the plants of which they left records have become extinct. It is difficult to name more than two species which seem to be hardly worth looking for at the present day, and only one of these, *Malaxis paludosa*, owes its absence to the extinction of the smaller bogs by drainage; the other, *Holosteum umbellatum*, is in all probability lost, but if it be so it is from a different cause, the destruction of old walls in the towns. The progress of improvement and development of the sea coast particularly is sadly interfering with some of our rarer plants, as for example with *Medicago sylvestris*, which has this year (1900) been very hardly dealt with at Cromer in the construction of works for the defence of the town from the sea. Still many more species have been added to the county list during the last fifty years than can possibly have disappeared, and the close of the nineteenth century witnesses no diminution in the number of species which are certainly to be found if looked for perseveringly. It is true that although rare plants have not been lost

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yet the number of specimens to be obtained in certain localities has much diminished, and it is to be hoped that collectors will recognize this fact and spare them as much as possible, but it seems not unlikely that in some parts of the county, owing to the deplorable depression of agriculture, a few of the lighter lands will 'go back to warren,' thus possibly affording asylum and offering a chance of increase to some of our specially hard-pressed rarities. On the other hand drainage is always being extended, thus last summer the upper pond at Antingham—one of the sources of the river Ant, which, much grown up by marsh and water plants, has been a sure locality for many plants—has had a deep, wide trench dug down the middle of it, the effect of which must be in a few years to ruin it botanically.

There can be but few of the counties of England which can claim as many specialties in species and varieties as Norfolk. *Najas marina* and *Carex trinervis* are found in it alone, as is also *Sonchus angustifolius*. *Rubus Lintoni*, *Carex ligerica*, *C. paradoxa*, *Ammophila baltica*, in but one other county only respectively, viz. Somerset, the Scilly Isles, Yorkshire, Northumberland. In addition it shares in the East Anglian specialties, *Silene otites*, *Holosteum umbellatum*, *Medicago falcata* and *M. sylvestris*, *Statice reticulata*, *Primula elatior*, Jacq., *Verbascum pulverulentum*, *Veronica verna*, *Liparis Loeselii*, *Carex ericetorum*, *Apera interrupta*, and *Weingartneria canescens*, in fact it may almost be doubted, if judged on precisely equal terms, whether any other of the lowland counties of England exceeds it in number of species; of course comparison with such counties as Devon or Yorkshire, the latter three times the size of Norfolk, and both with the advantage of mountains, would be absurd.

No account of the Norfolk flora however short can be considered even passably complete without mention of the distinguished botanists who have been born or lived in the county within the last hundred and fifty years. Sir James Edward Smith, 1759–1828, author of *English Botany*, 1790–1814; *Flora Britannica*, 1800–1804; *English Flora*, 1824–1828, who did so much for the study of botany in England by the purchase of Linnæus's Herbarium in 1783 and the formation of the Linnæan Society of which he was 'projector and president' in 1788. Dawson Turner of Yarmouth, 1775–1858, author of *The Botanist's Guide*, 1805, and *History of Fuci*, 1808. Sir William Jackson Hooker, 1785–1865, born at Norwich, author of *British Jungermanniæ*, 1816; *Muscologia Britannica*, 1818–1827; *Flora Scotica*, 1821; and *British Flora*, 1830, besides other works on botany too numerous to mention, Vice-President of the Linnæan Society and Director of the Royal Gardens at Kew. John Lindley, Ph.D., F.R.S., born at Catton, 1799–1865, author of *Synopsis of the British Flora*, 1820, and *Vegetable Kingdom*, 1846. These occupy the first rank among our local botanists of note. Nor must we omit those lesser lights whose names are frequently occurring in the botanical literature of the same period. T. J. Woodward (of Diss), James Crowe, Hugh Rose, John Pitchford, Lilly Wigg (of Yarmouth), the Revs. H. Bryant and R. B. Francis, S. P. Woodward, the Rev. G.

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R. Leathes, the brothers C. J. and Sir James Paget, B. Bray (of Lynn), and the Rev. Kirby Trimmer, and in his own special subject, Diatoms, Frederic Kitton.

Division of the county for Botanical Purposes.—Unfortunately the watersheds of Norfolk do not lend themselves to any system of division, and whatever system is adopted will be of necessity purely artificial. Mr. Hewett Cottrell Watson in his *Topographical Botany* took the first degree of longitude east of Greenwich as the division between east and west Norfolk, his vice-counties, Nos. 27 and 28: this line, which enters from the north at Blakeney (approximately) and leaves the county at Lopham to the south, divides it into two fairly equal portions, but this division is hardly adequate to show rarity or frequency of the occurrence of species within the county itself, however useful it may be for comparison with the rest of Great Britain.

In 1864 the Rev. G. Munford in the article 'Botany,' which he wrote for the 3rd edition of White's *History of Norfolk*, first proposed a division into four portions, which was adopted by the Norfolk and Norwich Naturalists' Society at their first meeting on April 27th, 1869, and has since been used for the society's lists of local flora, which may be described as follows: On the map of Norfolk draw two perpendicular lines, one running through Norwich and the other through Swaffham, and connect them by a horizontal line between those two places. This divides the county into two fairly equal central portions, having the division containing the 'Broads' to the east and that containing the 'Fens' to the west, and these divisions are called eastern, 'E'; north-central, 'NC'; south-central, 'SC'; and western, 'W'. These divisions have been indicated by their initial letters for the purposes of the present article.

Taking the ninth edition of the *London Catalogue* for our guide we find that the Flora of Great Britain, Ireland, and the Channel Islands contains 1,958 numbered items which we must call 'species,' and if we exclude the genus *Rubus*, concerning which so much difference of opinion and uncertainty exists and which numbers 99, we shall have 1,859 to be accounted for. Of these 1,164 have been recorded as occurring in the county on fairly good authority, and further, if we consider that the genus *Hieracium*, which numbers in the *Catalogue* 100 species, counts with us for only 5, we find that of the remainder of the species of the whole kingdom we have reason to claim just about two-thirds as having been found within the limits of the county. It must not be supposed that all the species counted are native or indigenous. 96 of them are printed in the *Catalogue* in italics as having no claim to be so regarded, and of the remainder many others belong to the classes which Mr. H. C. Watson described as 'denizen,' 'colonist,' or 'alien,' and a few are 'casuals,' but how readily a 'casual' or an 'alien' may become a well-established 'colonist' or 'denizen,' presenting the appearance at first sight of a 'native,' is shown by the instance of *Veronica Tournefortii*, which first noticed about 1830 has in seventy years become

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a well-established weed in many places, and has been found in every one of the four divisions into which Norfolk has been divided. *Erigeron Canadense*, certainly 'alien' in its origin, appears (as mentioned in the account of the 'sc' division) likely to become in suitable localities more numerous than the 'native' *Erigeron acre*. Many 'casuals,' such as *Adonis æstivalis*, *Tamarix gallica*, *Spiræa tomentosa*, *Sambucus racemosa*, *Lamium maculatum*, have been taken no notice of. This very year (1900) three casuals have appeared, two in the northern part of the county, *Abelia uniflora*, native of China and Japan; *Solanum rostratum*, native of Mexico; and one in the southern part, *Carduus benedictus*, native of South Europe: and so long as the practice of purchasing foreign 'seeds' is continued, and it is certain to increase rather than diminish, fresh 'casuals' will spring up, most of them to die out after a few years, but possibly a few to hold their own and by-and-bye to claim a place in future editions of the *London Catalogue*.

The following species have been omitted in compiling the table, although they have been reported or published as found within the county on seemingly good authority. The reasons for doing so in the cases of *Thalictrum majus*, *Stellaria nemorum*, *Statice rariflora*, *Veronica spicata* and *Juncus balticus* are given in the accounts of the 'sc' and 'w' divisions. *Brassica oleracea* is omitted because it has been recorded from all four divisions, thus raising great doubt whether it is anything more than an escape of the cultivated plant. *Crithmum maritimum* as too difficult to trace, being only recorded 120 years ago. *Inula crithmoides* was only a single specimen 116 years ago in an unlikely situation, and is regarded as an unclaimable 'casual.' *Cnicus heterophyllus* as not having been found lately in the neighbourhood whence reported, and *C. pratensis* abundant there having so often been mistaken for it. *Cynoglossum germanicum* not to be found now, and a subglabrous form of *C. officinale*, likely to be mistaken for it, being common in more than one locality. *Symphytum tuberosum*, a mistake suspected. *Pulmonaria officinalis*, probably only a garden escape. *Festuca sylvatica* and *F. dumetorum* for want of sufficient information; and *Equisetum variegatum* for uncertainty.

It is useless in a County History to speculate on the origin of the British flora, that being a subject which could only be profitably treated of by considering Great Britain as a whole; but it is clear that ever since land and water assumed approximately their present positions in this part of Europe the coast of Norfolk must have been the western boundary of the embouchure of the river Rhine or of the probably much larger river which in time past occupied its place and which must, especially in times of flood, have stranded many species on our shores. Mr. Clement Reid in his *Origin of the British Flora* has given (p. 171) a list of the plants whose fossil remains he has recovered from the Cromer Forest Bed, a Pre-Glacial deposit. Of all these (77) 'aquatic and wet-meadow species and forest trees' there are only three, *Trapa natans*, *Najas minor* and *Picea excelsa*, which are not now 'natives of Britain' and of the remainder there are but two, *Pinus sylvestris* and

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Isoetes lacustris, which are not now natives of Norfolk, and among them is the special Norfolk rarity, *Naias marina*, not found now in any other part of Britain, although Mr. Reid records it as fossil (p. 159) from 'Hertfordshire Inter-Glacial' and 'Glamorgan Neolithic' deposits. As Mr. Reid writes (p. 35): 'As far as the plants now inhabiting Britain are concerned history begins with the Cromer Forest Bed, all before is prehistoric and speculative.' Norfolk (and Suffolk) can claim the earliest flora at present determinable in Britain. In the Early Glacial period which followed, Mr. Reid records (p. 52) as being found on the Norfolk coast, *Betula nana* and *Salix polaris*, two very characteristic species of arctic flora, the former still remaining as far south as Northumberland, but the latter, once abundant even in the south of Devonshire, now no longer remaining in Great Britain though it still exists in Scandinavia. How the existing flora was developed after the Glacial period had passed away must in the present state of our knowledge of topographical botany be only matter of conjecture and hypothesis. Norfolk has been called the 'meeting-place of north and south,' and surely a county in which *Andromeda polifolia* and *Microcala filiformis* meet justly merits this title.

There do not appear to be any means of comparing accurately the respective floras of Norfolk and the adjoining counties of Suffolk and Cambridgeshire; for this purpose lists up to the present date and based on the same nomenclature and division of species would be required. Our table of species is based on the *London Catalogue* of 1895, while Dr. Hind's *Flora of Suffolk* is dated 1889, and Professor Babington's *Flora of Cambridge* was published in 1860. But from these floras compared with *Topographical Botany*, 1883, it is possible to indicate a few salient points of difference. Suffolk has between sixty and seventy miles of open sea coast, comparing not unfavourably in this respect with Norfolk, and in addition the estuaries of the rivers Stour, Orwell, Deben and Alde, whilst Cambridgeshire has only one side of a part of the estuary of the Nen.

Cambridgeshire is thus at a disadvantage as to number of maritime plants, but it has (or had) one which is absent from Suffolk, viz.: *Statice reticulata*. Suffolk has *Lathyrus maritimus* and *Diotis maritima* (extinct?) which are absent from Norfolk, whilst Norfolk has *Sonchus angustifolius*, *Statice auriculæfolia* and *S. reticulata*, *Polypogon Monspeliensis* and *P. littoralis* and *Ammophila baltica*, all of which are absent from Suffolk.

Norfolk has the following, all absent from both Suffolk and Cambridgeshire, *Draba muralis*, *Lathyrus montanus* (?), *Sedum rupestre*, *Crepis paludosa*, *Andromeda polifolia*, *Pyrola minor*, *Microcala filiformis*, *Teucrium Chamædrys*, *Juncus acutus*, *Naias marina*, *Eriophorum vaginatum*, *Carex paradoxa*, *C. ligerica* and *C. trinervis*, *Lycopodium Selago* and *Lychnothamnus stelliger*.

Suffolk has, absent from Norfolk and Cambridgeshire, *Genista pilosa*, *Vicia lutea*, *Orobanche caryophyllacea*, *Scrophularia umbrosa*, *Utricularia neglecta*, *Orchis hircina*, *Damasonium stellatum* (extinct) and *Anthoxanthum Puellii*.

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Cambridgeshire has, all of which are absent from Norfolk and Suffolk ; *Viola stagnina*, *Carum Bulbocastanum*, *Valeriana Auricula*, and *Ajuga Chamæpitys*.

Cambridgeshire and Norfolk have the following, which do not occur in Suffolk, *Ræmeria hybrida*, *Campanula patula*, *Narthecium Ossifragum* and *Pbleum asperum*.

Cambridgeshire and Suffolk have the following which are absent from Norfolk, *Vicia gracilis*, *Myriophyllum alterniflorum*, *Caucalis latifolia*, *Serratula tinctoria*, *Senecio campestris*, *Orobanche Picridis*, *Veronica spicata* and *Ophrys aranifera*.

Lastly, Norfolk and Suffolk have the following which are absent from Cambridgeshire, *Diplotaxis tenuifolia*, *Silene conica*, *Dianthus armeria*, *Holosteum umbellatum*, *Scleranthus perennis*, *Trigonella purpurascens*, *Tillæa muscosa*, *Chrysosplenium oppositifolium* and *C. alternifolium*, *Orobanche cærulea*, *Verbascum pulverulentum*, *Veronica verna* and *V. triphyllus*, *Scutellaria minor*, *Tulipa sylvestris*, *Gagea lutea*, *Lastrea cristata* and *L. uliginosa* and *Ceterach officinarum*.

The genus *Gentiana* is curiously distributed among the three counties. Norfolk has four species : *G. Amarella*, *G. Pneumonanthe*, *G. campestris* and *G. baltica* ; Suffolk but three, *G. baltica* not being differentiated there at present ; but Cambridgeshire has only one species : *G. Amarella*.

The writer has been so fortunate as to obtain the help of the following specialists who have each contributed an article. The Rev. G. R. Bullock-Webster, on Characeæ ; C. B. Plowright, M.D., on Fungi ; H. N. Dixon, on Mosses ; and the Rev. J. Crombie, on Lichens. His special and most grateful thanks are due to Mr. Arthur Bennett for correcting the list of Naiadaceæ and to the Rev. E. F. Linton for allowing him the use of his 'Norfolk Notes' on *Rubi* and *Rosæ*, also to the Norfolk and Norwich Naturalists' Society for allowing him free use of their Transactions. He also desires to record his indebtedness and thanks to The Rt. Hon. Lord Walsingham, F.R.S. ; Messrs. E. G. Baker, of the Museum of Natural History, South Kensington ; E. M. Holmes, of the Pharmaceutical Society's Museum ; R. H. Yapp, of the Cambridge University Herbarium ; E. A. Atmore, of the Museum, Kings Lynn ; and the Rev. E. K. Kerslake, for assistance given both by correspondence and personally.

The principal authorities to be consulted for localities and details of Norfolk Botany are, Withering, *Arrangement of British Plants*, 4th ed. 1801 ; Sir J. E. Smith, *English Botany*, 1st ed. 1790-1814 and *English Flora*, 1824-1828 ; *English Botany*, 3rd ed., edited by J. T. Boswell Syme, 1863 ; *Transactions of the Norfolk and Norwich Naturalists' Society* (various years) ; lists of Flora of Norfolk in White's *History*, 3rd ed. 1864, by the Rev. G. Munford, and in Mason's *History*, 1884 ; The Rev. Kirby Trimmer, *Flora of Norfolk and Supplement*, n.d. ; H. C. Watson, *Topographical Botany*, 2nd ed. 1883 ; and the Rev. E. F. Linton, 'Norfolk Notes,' *Journal of Botany*, June and July, 1900.

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TABLE OF FLOWERING PLANTS, FERNS, ETC., FOUND IN NORFOLK

ARRANGED IN ORDERS ACCORDING TO THE *London Catalogue*, 9TH EDITION (1895)

(Genus *Rubus* not included)

ORDER	Species in full type	Species in italics	TOTAL	ORDER	Species in full type	Species in italics	TOTAL
1. Ranunculaceæ . . .	33	4	37	46. Oleaceæ . . .	2	—	2
2. Berberideæ . . .	1	—	1	47. Apocynaceæ . . .	1	1	2
3. Nymphæaceæ . . .	2	—	2	48. Gentianaceæ . . .	11	—	11
4. Papaveraceæ . . .	7	1	8	49. Boraginææ . . .	13	4	17
5. Fumariaceæ . . .	4	1	5	50. Convolvulaceæ . . .	5	2	7
6. Cruciferæ . . .	45	9	54	51. Solanaceæ . . .	4	2	6
7. Resedaceæ . . .	2	—	2	52. Scrophularinææ . . .	38	4	42
8. Cistineæ . . .	1	—	1	53. Orobanchaceæ . . .	4	1	5
9. Violariææ . . .	8	—	8	54. Lentibulariææ . . .	4	—	4
10. Polygalææ . . .	2	—	2	55. Verbenaceæ . . .	1	—	1
11. Frankeniaceæ . . .	1	—	1	56. Labiataæ . . .	47	3	50
12. Caryophyllææ . . .	42	2	44	57. Plantaginææ . . .	6	—	6
13. Portulacææ . . .	2	1	3	58. Illecebraceæ . . .	3	—	3
14. Hypericineæ . . .	9	3	12	59. Chenopodiaceæ . . .	25	—	25
15. Malvaceæ . . .	4	—	4	60. Polygonaceæ . . .	20	1	21
16. Tiliaceæ . . .	1	1	2	61. Aristolochiaceæ . . .	—	1	1
17. Lineæ . . .	4	1	5	62. Thymelæaceæ . . .	2	—	2
18. Geraniaceæ . . .	16	3	19	63. Elæagnaceæ . . .	1	—	1
19. Illicinææ . . .	1	—	1	64. Loranthaceæ . . .	1	—	1
20. Celastrinææ . . .	1	—	1	65. Santalaceæ . . .	1	—	1
21. Rhamnææ . . .	2	—	2	66. Euphorbiaceæ . . .	7	2	9
22. Sapindaceæ . . .	1	1	2	67. Urticaceæ . . .	6	1	7
23. Leguminosæ . . .	54	5	59	68. Myricaceæ . . .	1	—	1
24. Rosaceæ (<i>Rubus</i> not included) . . .	—	—	—	69. Cupuliferæ . . .	8	—	8
25. Saxifragææ . . .	40	3	43	70. Salicinææ . . .	13	1	14
26. Crassulaceæ . . .	7	1	8	71. Ceratophyllææ . . .	2	—	2
27. Droseraceæ . . .	7	2	9	72. Coniferæ . . .	3	—	3
28. Haloragææ . . .	3	—	3	73. Hydrocharideæ . . .	3	—	3
29. Lythriææ . . .	7	—	7	74. Orchideæ . . .	27	—	27
30. Onograrieæ . . .	3	—	3	75. Irideæ . . .	2	1	3
31. Cucurbitaceæ . . .	9	2	11	76. Amaryllideæ . . .	2	3	5
32. Umbelliferææ . . .	1	—	1	77. Dioscoreæ . . .	1	—	1
33. Araliaceæ . . .	42	3	45	78. Liliaceæ . . .	15	4	19
34. Cornaceæ . . .	1	—	1	79. Juncaceæ . . .	17	—	17
35. Caprifoliaceæ . . .	1	—	1	80. Typhaceæ . . .	6	—	6
36. Rubiaceæ . . .	6	1	7	81. Aroideæ . . .	2	—	2
37. Valerianææ . . .	13	1	14	82. Lemnaceæ . . .	4	—	4
38. Dipsaceæ . . .	6	—	6	83. Alismaceæ . . .	4	—	4
39. Compositæ . . .	5	—	5	84. Naiadaceæ . . .	28	—	28
40. Campanulaceæ . . .	93	13	106	85. Cyperaceæ . . .	62	—	62
41. Vacciniaceæ . . .	8	—	8	86. Gramineæ . . .	95	7	102
42. Ericaceæ . . .	2	—	2	87. Filices . . .	23	—	23
43. Monotropeæ . . .	6	—	6	88. Equisetaceæ . . .	6	—	6
44. Plumbaginææ . . .	1	—	1	89. Lycopodiaceæ . . .	3	—	3
45. Primulaceæ . . .	4	—	4	90. Marsiliaceæ . . .	1	—	1
	13	—	13	91. Characeæ . . .	17	—	17
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A HISTORY OF NORFOLK

I.—THE EASTERN DIVISION

This division, designated by an 'E' in the tables of species, is bounded on the east by the sea and on the west by a line drawn perpendicularly on the map passing through Norwich and terminating northward at Cromer and southward at the river Waveney, which forms the boundary of the county just to the east of Harleston. Travelling northward along the coast from Yarmouth there is a flat sandy and shingly beach without cliffs as far as Happisburgh; from thence to Cromer there are cliffs varying in height, their highest point at Trimmingham being about 250 feet above the sea. These cliffs are composed of sand, gravel and clay with chalk at Trimmingham. Where the cliffs begin the flora changes, the sand-loving grasses still hold their own to some extent on the shore, but on the cliffs themselves and on their summits grow sometimes in considerable quantities *Orobanchæ cærulea* (its host being *Achillea Millefolium*), *Ophrys apifera* and *Equisetum maximum*. The seaward surface of these cliffs is continually changing as they slip into the sea from the action of the landsprings which undermine the lower portion of their face, and there are thus formed many little undercliffs which, existing for a few years, are the homes of many interesting plants, until in their turn both soil and plants fall on the beach and are washed away.

From the harbour's mouth at Yarmouth for about five miles, with the exception of the front of the town, extend the South and North Denes, which have been, and are still to some extent, though sadly injured in a botanical view by use as camping grounds, golf links, etc., the localities of a peculiar vegetation of their own, consisting principally of minute *Cerastia*, many *Trifolia*, *Lotus*, *Galium*, *Ononis* and dwarf grasses; among the latter *Weingartneria canescens* and *Poa bulbosa*, and in the deep sand near the beach grow *Ammophila arundinacea* and *A. baltica*, *Elymus arenarius* with *Tritica*, *Festuca arenaria* and *Carex arenaria*, which with their long creeping roots bind the loose sand together and enable it to resist the sea. At Caistor *Thalictrum dunense* still grows, and at Hemsby Mr. Wigg is said to have found *Crithmum maritimum* more than a century ago, but it has not been heard of since. *Atriplex pedunculata* unquestionably grew within the county limits, as there are specimens from Runham in Sir James Paget's Herbarium in the Norwich Castle Museum, but careful search in the last few years has failed to rediscover it.

Within the coast-line, approaching very near the sea at its northernmost corner, lies what is known as the 'Norfolk Broad' country, occupying an irregularly-shaped patch of about eight miles by twelve from Filby Broad in the south to Horsey Mere in the north, and from the latter point east to Wroxham Broad in the west. These shallow freshwater lakes communicate directly or indirectly with the river Bure, and were estimated by Mr. H. B. Woodward in 1881 to cover about 1,500 acres, and were considered by Mr. Gunn to be 'growing up' at the rate of one foot in twenty years. This district has two species of plants not found elsewhere in Great Britain, *Najas marina*, discovered in 1883 by Mr. Arthur Bennett, and *Carex trinervis*, first found in 1884 by the late Hampden G. Glasspoole; it contains also many other rare plants, such as *Senecio palustris*, *Liparis Loeselii* and *Carex paradoxa*. The water of the broads is crowded with Batrachian *Ranunculi*, white and yellow water-lilies, *Stratiotes aloides*, *Potamogetons* and *Utriculariæ*; and their margins are thick with *Cladium Jamaicense*, *Scirpi* and reeds, and hosts of *Lythrum Salicaria*, *Lysimachia vulgaris* and the commoner kinds of orchids, and on the banks of some of these broads there is plenty of *Pyrola rotundifolia*. The latest records of *Sonchus palustris* in this division are those of the late Rev. Kirby Trimmer in 1873 to 1876, and it is not known to have been found since.

The northern portion of this division between the coast-line, the Broad country, and the western boundary line is mostly arable, very few small patches of the original heathy, sandy or boggy soil being left as common or waste. Wherever there is a bog however small there abound *Drosera rotundifolia*, *D. intermedia* and *D. anglica*, and an apparent hybrid between *D. rotundifolia* and *D. anglica*, resembling the *D. obovata* of the west coast of Scotland, has occurred. *Pinguicula vulgaris* is very common, but the rarest plant of these bogs is *Limosella aquatica*. On the drier parts of the heaths there are three gentians, *Gentiana Amarella*, *G. campestris* and *G. Pneumonanthe*. *G. baltica* has been identified by Murbeck from one locality; and on dry banks, or by the roadsides, there are three mulleins, *Verbascum Thapsus*, *V. pulverulentum* and *V. nigrum*, and hybrids between the two latter are not unfrequent.

The city of Norwich, which is included in this division, has, or rather had, on its old city walls several rare plants, *Holosteum umbellatum*, *Teucrium Chamædryas* and *Muscari racemosum*, but as the walls themselves disappear so must the plants, which can hardly be considered

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as truly native. *Holosteum* was probably used, as its name would seem to imply, for some medical purpose, and it is strange that this plant should have been confined to East Anglia, beyond which it does not appear to have extended. I have not seen it growing since 1887, and the wall on which I then saw it was pulled down the following year.

Eastward of Norwich are two small broads communicating with the river Yare, and one of these at Surlingham was a locality for *Lastrea cristata*, now almost if not quite exterminated there. Further south, but still in this division, the late Rev. Kirby Trimmer first found *Potamogeton trichoides* in Norfolk, though he gives to Mr. Skepper the credit of having directed his attention to this species as having been found in Suffolk.

The neighbourhood of Brooke and Seething has yielded many rare plants, among them *Lathyrus Aphaca*, *Tulipa sylvestris* and *Doronicum plantagineum*, but this last has probably been introduced. *Blackstonia perfoliata* and *Panicum glabrum* are both apparently native in the extreme south of the division, and *Asplenium viride* appeared spontaneously, and held its own for many years, and was at last destroyed by an alteration to the wall on which it grew.

LIST OF SPECIES AND VARIETIES WORTH NOTING IN THE EASTERN DIVISION

<i>Thalictrum dunense</i> , Dum.	<i>T. suffocatum</i> , Linn.
<i>Caltha palustris</i> , L. var. approaching, C. Guérangerii (Boreau)	<i>T. hybridum</i> , Linn.
<i>Helleborus viridis</i> , Linn.	<i>T. agrarium</i> , Linn.
<i>H. foetidus</i> , Linn.	<i>T. filiforme</i> , Linn.
<i>Rœmeria hybrida</i> , DC.	<i>Lotus tenuis</i> , W. & K.
<i>Fumaria parviflora</i> , Lam.	<i>Hippocrepis comosa</i> , Linn.
<i>Arabis perfoliata</i> , Lam.	<i>Onobrychis viciæfolia</i> , Scop.
<i>Alyssum calycinum</i> , Linn.	<i>Vicia Bobartii</i> , Koch.
<i>A. maritimum</i> , Linn.	<i>V. lathyroides</i> , Linn.
<i>Cochlearia danica</i> , Linn.	<i>Lathyrus Aphaca</i> , Linn.
<i>C. anglica</i> , Linn.	<i>L. Nissolia</i> , Linn.
<i>Sisymbrium Irio</i> , Linn.	<i>L. sylvestris</i> , Linn.
<i>Diplotaxis tenuifolia</i> , DC.	<i>L. palustris</i> , Linn.
<i>Coronopus didymus</i> , Sm.	<i>Potentilla norvegica</i> , Linn.
<i>Lepidium latifolium</i> , Linn.	<i>P. argentea</i> , Linn.
<i>Raphanus maritimus</i> , Sm.	<i>Agrimonia odorata</i> , Mill
<i>Frankenia lævis</i> , Linn. (probably extinct)	<i>Tillæa muscosa</i> , Linn.
<i>Dianthus prolifer</i> , Linn.	<i>Sedum reflexum</i> , Linn.
<i>Silene nutans</i> , Linn.	<i>S. rupestre</i> , Linn.
<i>Holosteum umbellatum</i> , Linn.	<i>Drosera anglica</i> , Huds.
<i>Cerastium quaternellum</i> , Fenzl.	<i>D. intermedia</i> , Hayne
<i>Stellaria palustris</i> , Retz	<i>Oenothera biennis</i> , Linn.
<i>Arenaria tenuifolia</i> , Linn.	<i>Eryngium maritimum</i> , Linn.
<i>Althæa officinalis</i> , Linn.	<i>Bupleurum rotundifolium</i> , Linn.
<i>Tilia cordata</i> , Mill	<i>B. tenuissimum</i> , Linn.
<i>Linum perenne</i> , Linn.	<i>Apium graveolens</i> , Linn.
<i>Geranium phœum</i> , Linn.	<i>Carum segetum</i> , Benth. & Hook.
<i>G. striatum</i> , Linn.	<i>Sison Amomum</i> , Linn.
<i>G. sylvaticum</i> , Linn.	<i>Sium latifolium</i> , Linn.
<i>G. pyrenaicum</i> , Burm. fil.	<i>Anthriscus Cerefolium</i> , Hoffm.
<i>Erodium maritimum</i> , L'Herit.	<i>Fœniculum vulgare</i> , Mill
<i>Rhamnus frangula</i> , Linn.	(<i>Crithmum maritimum</i> , Linn.) (extinct)
<i>Genista tinctoria</i> , Linn.	<i>Ceanthe silaifolia</i> , Bieberstein
<i>Ulex Gallii</i> , Planch.	<i>Æ. fluviatilis</i> , Coleman
<i>U. nanus</i> , Forster	<i>Peucedanum palustre</i> , Mæncb
<i>Ononis repens</i> , Linn. ; v. <i>horrida</i> , Lange	<i>Galium maritimum</i> , D.C.
<i>Medicago falcata</i> , Linn.	<i>G. erectum</i> , Huds.
<i>M. denticulata</i> , Willd.	<i>G. anglicum</i> , Huds.
<i>M. arabica</i> , Huds.	<i>G. tricornis</i> , Stokes
<i>Melilotus alba</i> , Desv.	<i>Erigeron canadense</i> , Linn.
<i>Trifolium subterraneum</i> , Linn.	<i>Filago apiculata</i> , G. E. Sm.
<i>T. ochroleucon</i> , Huds.	<i>F. spathulata</i> , Presl.
<i>T. squamosum</i> , Linn.	<i>Anaphalis margaritacea</i> , Benth. & Hook.
<i>T. incarnatum</i> , Linn.	<i>Anthemis nobilis</i> , Linn.
<i>T. scabrum</i> , Linn.	<i>Artemisia maritima</i> , Linn.
<i>T. glomeratum</i> , Linn.	<i>A.</i> " v. <i>gallica</i> (Willd.)
	<i>Senecio viscosus</i> , Linn.

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- S. squalidus*, Linn.
S. palustris, DC.
Cnicus pratensis, Willd.
C. acaulis, Willd.
Onopordon Acanthium, Linn.
Centaurea Calcitrapa, Linn.
C. solstitialis, Linn.
Arnoseris pusilla, Gartn.
Crepis taraxacifolia, Thuill.
C. biennis, Linn.
Hypochæris glabra, Linn.
Lactuca Scariola, Linn.
Sonchus palustris, Linn.
Campanula latifolia, Linn.
C. Rapunculus, Linn.
C. patula, Linn.
Specularia hybrida
Vaccinium Myrtillus, Linn.
Schollera Occyccoccus, Roth.
Pyrola rotundifolia, Linn.
P. minor, Linn.
Hypopitys Monotropa, Crantz
Hottonia palustris, Linn.
Anagallis cœrulea, Schreb.
Centunculus minimus, Linn.
Blackstonia perfoliata, Huds.
Erythræa pulchella, Fr.
Gentiana Pneumonanthe
Myosotis sylvatica, Hoffm.
M. collina v. *Mittenii*, Baker
Volulus Soldanella, Junger.
Cuscuta europæa, Linn.
C. Epithymum, Murr.
C. Trifolii, Bab.
Atropa Belladonna, Linn.
Verbascum pulverulentum, Vill.
V. nigrum, Linn.
Linaria Elatina, Mill.
L. spuria, Mill.
L. repens, Mill.
L. viscida, Mœnch
Antirrhinum Orontium, Linn.
Limosella aquatica, Linn.
Melampyrum arvense, Linn.
Orobanche purpurea, Jacq.
O. ramosa, Linn.
O. elatior, Sutt.
O. minor, Sm.
O. „ v. *flavescens*, Reuter
Utricularia intermedia, Hayne
Thymus Chamædrys, Fr.
Calamintha parviflora, Lam.
Scutellaria minor, Huds.
Teucrium Scordium, Linn.
T. Chamædrys, Linn.
Chenopodium polyspermum, Linn.
C. vulvaria, Linn.
C. ficifolium, Sm.
C. murale, Linn.
C. hybridum, Linn.
C. urbicum, Linn.
C. botryodes, Sm.
Beta maritima, Linn.
Atriplex littoralis, Linn.
A. deltoidea, Bab.
A. laciniata, Linn.
A. portulacoides, Linn.
A. pedunculata, Linn. (extinct)
Salicornia radicans, Sm.
Polygonum Raii, Bab.
P. minus, Huds.
Rumex maritimus, Linn.
R. limosus, Thuill.
R. pulcher, Linn.
Aristolochia clematitis, Linn.
Hippophae rhamnoides, Linn.
Viscum album, Linn.
Euphorbia amygdaloides, Linn.
E. Cyparissias, Linn.
E. Lathyris, Linn.
Mercurialis annua, Linn.
Urtica pilulifera, Linn.
Carpinus Betulus, Linn.
Ceratophyllum demersum, Linn.
C. submersum, Linn.
Elodea canadensis, Michx.
Hydrocharis Morsus-ranæ, Linn.
Stratiotes aloides, Linn.
Liparis Loeselii, Rich.
Spiranthes autumnalis, Rich.
Goodyera repens, R. Br.
Cephalanthera ensifolia, Rich.
Epipactis violacea, Boreau
Aceras anthropophora, R. Br.
Herminium Monorchis, R. Br.
Polygonatum multiflorum, All.
Muscari racemosum, Mill
Ornithogalum pyrenaicum, Linn.
Fritillaria Meleagris, Linn.
Tulipa sylvestris, Linn.
Sparganium ramosum, Huds.
S. neglectum, Beeby.
Acorus Calamus, Linn.
Scirpus cernuus, Vahl.
S. triqueter, Linn.
Carex divisa, Huds.
C. paradoxa, Willd.
C. Hudsonii Ar., Benn.
C. trinervis, Desglad
C. limosa, Linn.
C. strigosa, Huds.
C. filiformis, Linn.
C. Pseudo-cyperus, Linn.
Panicum glabrum, Gand.
Alopecurus fulvus, Sm.
A. bulbosus, Gouan.
Calamagrostis lanceolata, Roth.
Gastridium australe, Beauv.
Apera spica-venti, Beauv.
Ammophila baltica, Link.
Poa bulbosa, Linn.
Glyceria Borreri, Bab.
Festuca procumbens, Kunth.
F. rottbœllioides, Kunth.
Bromus erectus, Huds.
B. racemosus, Linn.
Brachypodium pinnatum, Beauv.
Agropyron acutum, R. & S.
A. junceum, Beauv.
Hordeum marinum, Huds.
Elymus arenarius, Linn.

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II.—THE NORTH-CENTRAL DIVISION

This division designated by 'NC' in the tables of species is bounded on the east by a line drawn from Norwich to Cromer, and on the west and south by lines from Norwich to Swaffham, and from Swaffham to Burnham Deepdale and the sea; differs in its character from the Eastern Division—it has no broads and but few freshwater marshes—but it contains long stretches of salt marsh, and here and there still retains boggy heaths, mostly commons, which shelter samples of the original flora, and it was largely from this kind of country before the enclosures took place that the plants were obtained that made Norfolk remarkable as a county in the writings of the botanists of the later part of the last and early portion of the present century. The quantity of this boggy land is continually decreasing, and it has happened to the writer on revisiting after an interval of a few years a locality of this description to find—instead of sundews (all three species), butterwort, *Parnassia*, dwarf willows and other marsh plants—a fine crop of corn ready for the harvest.

The salt marshes, which commence at Weybourne where the cliffs end, extend throughout this and the Western Division with occasional breaks (the most remarkable of which is the celebrated Red Chalk cliff of Hunstanton) all the way to Lynn, have a special vegetation of their own—acres of sea-lavenders, crabgrass (*Atriplex portulacoides*), *Salicornia*, *Suaeda* and *Juncus*. There are also three remarkable grasses: *Polypogon monspeliensis*, *P. littoralis* and *Spartina stricta*. The sea-lavenders are of three species: *Statice Limonium*, *S. auriculæfolia* and *S. reticulata*; *S. Limonium* appears in two forms, the type and the variety *pyramidalis*, Syme—this variety flowers about three weeks later than the type, and seems, in this division at all events, to have been mistaken for *S. rariflora*. At Wells occurs the curious variety or form of *Sonchus arvensis*, *S. angustifolius*, Mey., which was first found here in Great Britain; it also grows on the opposite coast of Holland. At Stiffkey there is plenty of *Scrophularia vernalis*. At Holkham *Gnaphalium luteo-album*, Linn., is well established, and *Erythræa pulchella* from one to eight inches in height, according as it grows on dry sand or in marsh, abounds. *Suaeda fruticosa* at Cley forms a thicket giving first shelter to flocks of small migrating birds on their arrival. This plant is reported to have been brought hither by shipwreck, and to have spread hence along the coast. Wherever loose sand occurs it is bound together by grasses, *Festuca arenaria*, *Elymus arenarius*, *Agropyron* (of several species), 'Marram' *Ammophila arundinacea* (which is often planted for protection against the sea) and *Carex arenaria*. *Juncus acutus* forms large clumps in the westward portion of this division, but I have never seen it east of Wells. *J. compressus* grows at Holkham, and also a small intermediate form between this species and *J. Gerardi*, which last is common in brackish marshes all round the Norfolk coast, and an hybrid between *J. acutiflorus* and *J. lamprocarpus* has been found in small quantity. *Glaucium flavum*, *Eryngium maritimum* and *Volkulus Soldanella* are frequent just above high-water mark.

On the sand between the actual beach and the brackish marshes, as for instance at Wells, are many species of *Chenopodium* and *Atriplex*, particularly *C. rubrum* and its var. *pseudo botryodes*, and near the Watch-house is a large patch of henbane, *Hyoscyamus niger*, closely cropped by rabbits with whom it seems, spite of its poisonous qualities, to agree well. *Frankenia lævis* also occurs but in small quantity, with plenty of *Silene maritima*.

On the cliffs between Cromer and Weybourne there are two broom rapes, *Orobanchè elatior* parasitic on *Centaurea scabiosa*, and *O. purpurea* on *Achillea Millefolium*. This latter is very uncertain, one year there will be hundreds, and the next hardly a single one. *Silene conica* is plentiful, and is mixed with *Diplotaxis muralis* sometimes so luxuriant as to approach the var. *Babingtonii*, Syme.

At Cromer *Medicago sylvestris* was at one time abundant, but a good deal of the edge of the cliff on which it grew has been removed by 'improvements'; it was for the most part rooted in almost pure windblown sea-sand, and seems both by habit and the form of its legume to occupy an intermediate place between the true *M. falcata*, a weed of cultivated land in the southern part of this division, and *M. sativa* in the semi-naturalized condition in which the latter is often found.

Scutellaria minor has been known in this division for from seventy to eighty years, but it is very capricious, sometimes flowering profusely and at others being difficult to find, although the locality remains unaltered.

In the heaths which still remain unenclosed and untilled there are three gentians, *Gentiana Amarella*, *G. campestris* and *G. Pneumonanthe* (but *G. baltica* has not at present been

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identified in this Division). On the drier parts of these heaths grow *Antennaria dioica*, *Radiola linoides* and *Tillæa muscosa*; and in the wetter portions are *Hypericum elodes*, *Limosella aquatica*, *Drosera anglica*, *D. rotundifolia* and *D. intermedia*, but no hybrid between the two first of these species, as noticed in the Eastern Division, has been observed.

Malaxis paludosa has certainly occurred, but not recently (*Liparis Læselii* is absent from this Division), and in two stations about twelve miles apart (one of them just within the 'E' division) *Goodyera repens* has been found, in one case in very small quantity, but in the other well established, having been noticed for many years. This plant has probably been brought with the fir trees among which it grows. Both woods were planted somewhere about the beginning of the nineteenth century, but no record can be obtained to show whence the trees came.

In the neighbourhood of North Walsham *Sedum rupestre* occupies hedgebanks for a distance of several miles; it behaves as if wild, but rarely flowers, increasing rapidly by its shoots. *Lythrum Hyssopifolia* was formerly to be found in one locality near Norwich which is now converted into building land. On some of the newly-reclaimed marshes near Wells *Phragmites communis* has adopted a creeping habit, recumbent stems have been measured over ten feet in length. *Glyceria Borreri* has also been found in that neighbourhood. *Pinus sylvestris* has become naturalized, plantations having been formed. As the trees have matured and seeded freely, woods of young firs have grown up to leeward on suitable heathy soil, and what the writer can remember as open common is now well clothed with firs.

LIST OF SPECIES AND VARIETIES WORTH NOTING IN THE NORTH-CENTRAL DIVISION

<i>Thalictrum collinum</i> , Wallr.	<i>Alchemilla vulgaris</i> , Linn.
<i>Anemone Pulsatilla</i> , Linn.	<i>Poterium officinale</i> , Hook. fil.
<i>Ranunculus confusus</i> (Godr.)	<i>Tillæa muscosa</i> , Linn.
<i>R. parvulus</i> , Linn.	<i>Sedum album</i> , Linn.
<i>Glaucium flavum</i> , Crantz	<i>S. rupestre</i> , Linn.
<i>Fumaria densiflora</i> , DC.	<i>Drosera rotundifolia</i> , Linn.
<i>Lepidium Draba</i> , Linn.	<i>D. anglica</i> , Huds.
<i>Crambe maritima</i> , Linn.	<i>D. intermedia</i> , Hayne
<i>Cakile maritima</i> , Scop.	<i>Myriophyllum pectinatum</i> (DC.)
<i>Reseda lutea</i> , Linn.	<i>Lythrum Hyssopifolia</i> , Linn.
<i>Viola hirta</i> , Linn.	<i>Epilobium roseum</i> , Schreb.
<i>Frankenia lævis</i> , Linn.	<i>Eryngium maritimum</i> , Linn.
<i>Dianthus deltoides</i> , Linn.	<i>Œnanthe Lachenalii</i> , C. Gmel.
<i>Saponaria Vaccaria</i> , Linn.	<i>Viburnum Lantana</i> , Linn.
<i>Silene puberula</i> , Syme	<i>Galium anglicum</i> , Huds.
<i>S. maritima</i> , With.	<i>Asperula cynanchica</i> , Linn.
<i>S. conica</i> , Linn.	<i>A. arvensis</i> , Linn.
<i>Cerastium arvense</i> , Linn.	<i>Filago apiculata</i> , G. E. Sm.
<i>Sagina maritima</i> , Don.	<i>F. spathulata</i> , Presl.
<i>S. subulata</i> , Presl.	<i>Antennaria dioica</i> , R. Br.
<i>Hypericum hircinum</i> , Linn.	<i>Gnaphalium luteo-album</i> , Linn.
<i>H. dubium</i> , Leers.	<i>Inula Conyza</i> , DC.
<i>H. hirsutum</i> , Linn.	<i>Pulicaria vulgaris</i> , Gært.
<i>H. elodes</i> , Linn.	<i>Artemisia nobilis</i> , Linn.
<i>Radiola linoides</i> , Roth.	<i>Artemisia maritima</i> , Linn.
<i>Linum angustifolium</i> , Huds.	<i>A.</i> " v. <i>gallica</i> (Willd.).
<i>L. usitatissimum</i> , Linn.	<i>Senecio erucifolius</i> , Linn.
<i>Geranium lucidum</i> , Linn.	<i>Carlina vulgaris</i> , Linn.
<i>Erodium cærophylloides</i> (Cav.).	<i>Arctium majus</i> , Bernb.
<i>E. moschatum</i> , L'Herit.	<i>Carduus pycnocephalus</i> , Linn.
<i>Euonymus europæus</i> , Linn.	<i>Cnicus pratensis</i> , Willd.
<i>Rhamnus catharticus</i> , Linn.	<i>Onopordon Acanthium</i> , Linn.
<i>Genista anglica</i> , Linn.	<i>Centaurea decipiens</i> , Thuill.
<i>Trigonella purpurascens</i> , Lam.	<i>C. Cyanus</i> , Linn.
<i>Medicago sylvestris</i> , Fr.	<i>C. Calcitrapa</i> , Linn.
<i>Melilotus officinalis</i> , Lam.	<i>Crepis taraxacifolia</i> , Thuill.
<i>M. arvensis</i> , Wallr.	<i>C. setosa</i> , Hall. fil.
<i>Trifolium striatum</i> , Linn.	<i>C. nicænsis</i> , Balt.
<i>T. fragiferum</i> , Linn.	<i>C. biennis</i> , Linn.
<i>Vicia gemella</i> , Crantz	<i>Hypochaeris maculata</i> , Linn.
<i>V. angustifolia</i> , Linn.	<i>Leontodon hirtus</i> , Linn.

BOTANY

Lactuca saligna, Linn.
Sonchus arvensis, var. *angustifolius*, Mey.
Campanula glomerata, Linn.
C. patula, Linn.
Specularia hybrida, A. DC.
Pyrola minor, Linn.
Hypopitys Monotropa, Crantz
Statice Limonium, Linn.
S. " v. *pyramidalis*, Syme.
S. auriculæfolia, Vahl. ; a. *occidentalis* (Lloyd)
S. reticulata, Linn.
Armeria maritima, Willd.
Glaux maritima, Linn.
Centunculus minimus, Linn.
Samolus Valerandi, Linn.
Erythræa pulchella, Fr.
Gentiana Pneumonanthe, Linn.
G. Amarella, Linn.
G. campestris, Linn.
(Asperugo procumbens), Linn.).
Myosotis sylvatica, Hoffm.
Lithospermum officinale, Linn.
L. arvense, Linn.
Echium vulgare, Linn.
Cuscuta europæa, Linn.
C. Epithymum, Murr.
C. Trifolii, Bab.
Atropa Belladonna, Linn.
Hyoscyamus niger, Linn.
Verbascum pulverulentum, Vill.
V. Lychnitis, Linn.
V. nigrum, Linn.
V. " x *pulverulentum*
Antirrhinum Orontium, Linn.
Scrophularia vernalis, Linn.
Limosella aquatica, Linn.
Melampyrum cristatum, Linn.
M. arvense, Linn.
Orobanche purpurea, Jacq.
O. elatior, Sutton
Pinguicula vulgaris, Linn.
Scutellaria minor, Huds.
Plantago maritima, Linn.
Scleranthus biennis, Reuter
Chenopodium Vulvaria, Linn.
C. ficifolium, Sm.
C. hybridum, Linn.
C. rubrum, Linn.
C. pseudo-botryodes, H. C. Wats.
C. glaucum, Linn.
Atriplex serrata, Moq.
A. laciniata, Linn.
A. portulacoides, Linn.
Salicornia radicans, Sm.
Suaeda fruticosa, Forsk.
Polygonum mite, Schrank.
Rumex maritimus, Linn.
R. limosus, Thuill.
Daphne Mezereum, Linn.
Hippophae rhamnoides, Linn.
Euphorbia Esula, Linn.
Mercurialis annua, Linn.
Carpinus Betulus, Linn.
Ceratophyllum demersum, Linn.
C. submersum, Linn.
Pinus sylvestris, Linn. (*self-sown*)

Elodea Canadensis (Michx.)
Hydrocharis Morsus-ranæ, Linn.
Stratiotes Aloides, Linn.
Malaxis paludosa, Liv.
Neottia Nidus-avis, Richd.
Spiranthes autumnalis, Richd.
Goodyera repens, R. Br.
Cephalanthera ensifolia, Richd.
Epipactis latifolia, All.
E. media, Fr.
Ophrys apifera, Huds.
Habenaria bifolia, R. Br.
H. chloroleuca, Rid.
Iris fœtidissima, Linn.
Galanthus nivalis, Linn.
Convallaria majalis, Linn.
Ornithogalum nutans, Linn.
O. umbellatum, Linn.
Tulipa sylvestris, Linn.
Juncus squarrosus, Linn.
J. compressus, Jacq.
J. diffusus, Hoppe.
J. maritimus, Lam.
J. obtusiflorus, Ehr.
J. acutiflorus x *lamprocarpus*
Sparganium minimum, Fr.
Acorus Calamus, Linn.
Eleocharis acicularis, R. Br.
E. multicaulis, Sm.
Scirpus Tabernæmontani, Gmel.
S. maritimus v. *compactus*, Koch
Eriophorum latifolium, Hoppe
Rhynchospora alba, Vahl.
Schoenus nigricans, Linn.
Carex divisa, Huds.
C. axillaris, Good
C. limosa, Linn.
C. strigosa, Huds.
C. distans, Linn.
C. flava v. *cyperoides*, Marsson
C. Pseudo-cyperus, Linn.
C. riparia, Curtis
C. vesicaria, Linn.
Spartina stricta, Roth.
Phleum pratense v. *nodosum* (Linn.).
P. arenarium, Linn.
Polypogon monspeliensis, Desf.
P. littoralis, Sm.
Gastridium australe, Beauv.
Apera Spica-venti, Beauv.
Ammophila arundinacea, Host.
Deschampsia discolor, R. & S.
Glyceria distans, Linn.
G. Borreri, Bab.
Festuca procumbens, Kunth.
F. rottbœllioides, Kunth.
Bromus erectus, Huds.
B. " v. *villosus*, Bab.
Agropyron pungens, R. & S.
A. " v. *littorale* (Reichb.).
A. acutum, R. & S.
A. junceum, Beauv.
Lepturus filiformis, Trin.
Hordeum marinum, Huds.
Elymus arenarius, Linn.

A HISTORY OF NORFOLK

III.—THE SOUTH-CENTRAL DIVISION

This division, designated by 'SC' in the tables of species, is bounded on the north by a line drawn from Swaffham to Norwich, on the east by a line from Norwich to a point a little east of Harleston, on the west by a line from Swaffham to Santon Downham, and on the south by the rivers Little Ouse and Waveney, which form the boundary of the county. It is particularly interesting for the flora of the dry sandy and calcareous country running north from Thetford, in which case plants of a dry sand-loving district are to some extent mixed with others originally maritime, the remnants of a flora formerly occupying the beaches of a strait which separated Norfolk from the rest of East Anglia.

Among the species which are found on these low hills are *Silene Otites*, *Arenaria tenuifolia*, in more than one form; *Medicago minima*, *Veronica verna* and *V. triphyllus*, *Scleranthus perennis*, *Carex arenaria*, and *C. ericetorum*, *Festuca ambigua* and *Pbleum arenarium*, and in the marshes by the river is *Rumex maritimus*; there are also *Medicago sylvestris* (recorded in the county only here and at Cromer), *Artemisia campestris* and *Apera interrupta* in the neighbourhood; it is strange that *Veronica spicata* has not been found within the county of Norfolk, as an old record traces it within about a mile beyond the boundary near Thetford growing in abundance.

The marshes near the sources of the river Waveney are the latest known habitat in the county of *Malaxis paludosa* and they still yield *Liparis Læselii*, but these marshes have become distinctly drier, and the number of individuals of the rarer plants, though not perhaps the number of species to be found in them, has diminished within the writer's experience.

Geranium rotundifolium has been recorded for the county in this division only and *G. pyrenaicum* has increased rapidly in this division of late years. *Impatiens Noli-me-tangere* has sprung up as a weed in newly-turned soil. *Gnaphalium luteo-album* and *Andromeda polifolia* have both been recorded from Harling. *Primula elatior*, Jacq., the true oxlip grows near Dickleburgh as is shown in Mr. Miller Christy's account of the distribution of that species in the eastern counties. *Viscum album*, which is more abundant in this division than in the remainder of the county, is recorded by the Rev. Kirby Trimmer as having grown on oak at Shottesham, and *Schollera Occycoccus* is reported by Lord Walsingham as plentiful near Merton.

Limnanthemum peltatum grows in the mere at Scoulton, and *Linaria purpurea* on walls at Thetford. *Erigeron Canadense* has taken such possession at Merton that Lord Walsingham writes: 'It has now almost driven *E. acre* out, and has increased to such an extraordinary extent as to affect very sensibly the colour of the landscape when its young green growth is in full vigour before flowering.'

The central portion of this division is remarkable for the number and quantity of the commoner species of orchids found in it; in some of the rougher pastures orchids when in flower seem actually more plentiful than grass. *Aceras anthropophora*, *Ophrys muscifera* and *Habenaria viridis* occur more often than in the other divisions of the county.

At Winfarthing is an oak known as the 'Winfarthing Oak' of great but unknown age. It is said to have been called the 'Old Oak' in the time of William the Conqueror, but there appears to be no definite authority for this legend, and the tree is not mentioned in *Domesday Book*. From the girth of its stem, which is now a mere shell, it has been supposed to be 1,500 years old. It has a brass plate affixed to it inscribed, 'This oak in circumference at the extremities of the roots is 70 feet, in the middle 40 feet, 1820.' From the Journal of R. Marsham, F.R.S., of Stratton Strawless, it measured in 1744 38 feet 7 inches, and in 1874 it measured 40 feet, having increased 17 inches in 130 years, but in 1894 its measurement was only 38 feet 6 inches, having shrunk 18 inches in twenty years. A full account of this remarkable tree by the late T. E. Amyot will be found in the *Transactions of the Norfolk and Norwich Naturalists' Society* for 1874.

The South-Central Division of the county has been much less worked, and there are much fewer records of botanical localities in it than in the other three divisions.

LIST OF SPECIES AND VARIETIES WORTH NOTING IN THE SOUTH-CENTRAL DIVISION

Anemone ranunculoides, Linn.
Dianthus Armeria, Linn.
D. deltoides, Linn.
Silene conica, Linn.
S. Otites, Wibel,

Arenaria tenuifolia, Linn.
A. " v. *hybrida* (Vill.)
Sagina ciliata, Fr.
Hypericum montanum, Linn.
Geranium phæum, Linn.

BOTANY

G. pratense, Linn.
G. rotundifolium, Linn.
Impatiens Noli-me-tangere, Linn.
Medicago sylvestris, Fr.
M. falcata, Linn.
M. minima, Desr.
Melilotus arvensis, Wallr.
Lotus villosus, Ser.
Astragalus danicus, Retz.
A. glycyphylus, Linn.
Vicia Bobartii, Koch
Lathyrus Aphaca, Linn.
Callitriche verna, Linn.
C. hamulata, Kuetz.
Oenanthe fluviatilis, Coleman
Asperula cynanchica, Linn.
Erigeron canadense, Linn.
Gnaphalium luteo-album, Linn.
Pulicaria vulgaris, Gærtn.
Artemisia campestris, Linn.
Petasites fragrans, Presl.
Senecio squalidus, Linn.
Cnicus eriophorus, Roth.
Arnoseris pusilla, Gærtn.
Lactuca Scariola, Linn.
Campanula latifolia, Linn.
C. Rapunculus, Linn.
Schollera Occycoccus, Roth.
Andromeda Polifolia, Linn.
Hypopitys Monotropa, Crantz
Primula elatior, Jacq.
Blackstonia perfoliata, Huds.
Limnanthemum peltatum, S. P. Gmel.
Myosotis Mittenii, Baker
Cuscuta Epilinum, Weibe
Linaria spuria, Mill.
L. purpurea, Linn.
Veronica triphyllos, Linn.

V. verna, Linn.
Euphrasia nemorosa, H. Mart.
E. gracilis, Fr.
Odontites serotina (Reichb.)
Origanum megastachyum (Link.)
Calamintha parviflora, Lam.
Scleranthus perennis, Linn.
Rumex maritimus, Linn.
R. limosus, Thuill.
Daphne Laureola, Linn.
Viscum album, Linn.
Euphorbia retusa (DC.).
E. Lathyris, Linn.
Malaxis paludosa, Sw.
Liparis Loeselii, Rich.
Neottia Nidus-avis, Rich.
Aceras anthropophora, R.Br.
Ophrys muscifera, Huds.
Ruscus aculeatus, Linn.
Polygonatum multiflorum, All.
Allium oleraceum, Linn.
Colchicum autumnale, Linn.
Sparganium neglectum, Beeby
Carex axillaris, Gord.
C. Hudsonii, Ar. Benn.
C. gracilescens, Almqvist
C. ericetorum, Poll.
C. filiformis, Linn.
Panicum Crus-galli, Linn.
Setaria verticillata, Beauv.
Alopecurus fulvus, Sm.
Phleum phalaroides, Koel.
P. arenarium, Linn.
Apera Spica-venti, Beauv.
A. interrupta, Beauv.
Festuca ambigua, Le Gall.
Bromus interruptus, Hackel
B. arvensis, Linn.

IV.—THE WESTERN DIVISION

This division, designated by 'W' in the tables of species, is bounded on the east by a line drawn from Santon Downham on the Little Ouse river northwards through Swaffham, and reaching the sea in the north near Burnham Deepdale, and includes all westward of this line to the county boundary. It contains in its eastern portion a large tract of high, sandy, and calcareous land, which reaches the greatest elevation of the whole county near Massingham. The marshes on its northern edge are mostly, if not all, brackish or salt, but from Brandon northwards there is a very extensive range of fenland.

On the arid land west and north-west of Swaffham there is a continuation of the peculiar flora noticed in the South-Central Division, with many additional species among them: *Viola hirta*, *Astragalus danicus*, *Caucalis daucoides*, *Herniaria glabra*, *Thesium humifusum*, *Orchis ustulata*, *Herminium Monorchis*, *Festuca uniglumis*. This dry country shades off towards Lynn into swampy heaths and fens very rich in plants. Here the late Mr. Bray was the first to find *Microcala filiformis*, a species apparently quite out of its latitude, so far as Great Britain is concerned, although its distribution extends northward to Denmark. This district has been one of the longest known and most prolific habitats in the county for *Lastrea cristata* and *L. uliginosa*. Dr. Lowe has recorded *Asplenium acutum* from Roydon. *Narthecium Ossifragum* and *Schollera Occycoccus* also grow here.

Thalictrum majus has been recorded for more than one station at the Burnhams, and is placed by Mr. Munford in his 'W' division, although, as defined by Mr. Kirby Trimmer, both stations would be really in the 'NG' division, but having visited the vicinity of the 'Gallow' or Gallows Hill this year (1900), the writer saw there nothing but *T. collinum*, and but very little of that species.

A HISTORY OF NORFOLK

At Docking, in the years 1834 and 1837, the Rev. Kirby Trimmer found an *Epipactis*, which he identified as *E. atrorubens*, and of which he gives a description in his *Supplement to the Flora of Norfolk* (p. 57). On Ringstead Downs *Gentiana Amarella* still grows, and *Dianthus deltoides* has been reported on very good authority from Brancaster.

Lathyrus montanus is included in a list of plants growing near Sandringham, published by Mr. Moxon in the *Phytologist* in 1843, this being the only record for that species in the whole county. It is very remarkable that a plant so widely distributed in Great Britain should be so rare here; and perhaps equally strange that *Serratula tinctoria* should never have been found, and *Alchemilla vulgaris* but very seldom.

The sea coast of this division does not differ in its vegetation from that of the north-central. From Brancaster westward to Hunstanton extend many miles of brackish or salt marshes, but with no new species. *Statice Bahusensis*, Fr. = *S. variflora*, Drej., which was recorded by the late Professor C. C. Babington from Holme, must be excluded from our list unless, or until, it should be found by some fresh observer, as Mr. R. H. Yapp, of the Cambridge University Herbarium, who has kindly examined the specimen preserved there, considers that it is very probably only a variety of *S. Limonium*, and specimens sent by the Rev. E. K. Kerslake (formerly Blyth) from Burnham Deepdale, as quoted in Mr. Kirby Trimmer's *Flora* (p. 119), differ but slightly from the type of that species.

Juncus acutus is not uncommon on the Brancaster and Deepdale marshes, but a rush found at Heacham, between Hunstanton and Lynn, named by Mr. Bray *Juncus balticus*, is, according to a specimen in the Lynn Museum, only a dwarf and undeveloped form of *J. maritimus*.

The fens on the western side of this division are remarkable as having been the habitat of *Senecio paludosus*, one of the most local and very rarest of British flowering plants. Mr. Arthur Bennett records in the *Transactions of the Norfolk and Norwich Naturalists' Society* for 1898-99 (p. 458) the finding of this species by Mr. Marshall of Ely in Redmore Fen. This locality is only just within the county boundary to the west of the Little Ouse, where the boundary turns northward in the neighbourhood of Brandon.

A curious variety, or rather state, of *Carex arenaria*, *C. ligerica*, having the 'female spikelets above the male,' has been found by Mr. Balding at Castle Rising, the only other known locality in Great Britain being the Scilly Islands.

Veronica spicata has been published as a native in Norfolk on the authority of a specimen collected by Mr. Wardale in the Herbarium at South Kensington; but Mr. E. G. Baker, having kindly examined it, reports that it is misnamed, being really *V. officinalis*, and a specimen in the possession of Mr. Balding of Wisbeach, found by his father, long supposed to be this species, proves to be only a slightly abnormal form of *V. serpyllifolia*. *Stellaria nemorum* must also be excluded from our list, having been published as from 'Winch (Norfolk), Dawson Turner,' but Mr. Baker finds that it was really received by D. Turner from 'Winch,' the well known author of the *Botanist's Guide to Northumberland*.

Cotyledon Umbilicus is reported by the Rev. J. H. Bloom from Castle Acre, the only record for the county; also *Pyrus torminalis*, but the latter as 'planted.'

Records are very scanty and much needed for the Hundred of Freebridge Marshland. This large area of 81,000 acres occupies but little space comparatively in our botanical lists.

LIST OF SPECIES AND VARIETIES WORTH NOTING IN THE WESTERN DIVISION

Thalictrum collinum, Wallr.
Delphinium Ajacis, Reichb.
Fumaria parviflora, Linn.
Draba muralis, Linn.
Coronopus didymus, Linn.
Lepidium latifolium, Linn.
L. ruderale, Linn.
L. Draba, Linn.
Iberis amara, Linn.
Isatis tinctoria, Linn. (extinct ?)
Viola hirta, Linn.
Frankenia lœvis, Linn.
Silene Otites, Wibel.
Geranium sanguineum, Linn.
G. sylvaticum, Linn.

Medicago minima, Desr.
Trifolium squamosum, Linn.
Astragalus danicus, Retz.
Lathyrus sylvestris, Linn.
L. montanus, Bernh.
Geum intermedium, Ebr.
Alchemilla vulgaris, Linn.
Tillœa muscosa, Linn.
Cotyledon Umbilicus, Linn.
Sedum album, Linn.
S. reflexum, Linn.
Epilobium adnatum, Grisebach
Bupleurum tenuissimum, Linn.
Carum segetum. Bent. & Hook. fil.
C. Carui, Linn.

BOTANY

Pimpinella major, *Huds.*
Caucalis daucoides, *Linn.*
Galium tricornis, *Stokes*
Asperula cynanchica, *Linn.*
Aster Tripolium, *Linn.* (rayless var.)
Filago apiculata, *G. E. Sm.*
F. spatulata, *Presl.*
Matricaria maritima, *Linn.*
Artemisia campestris, *Linn.*
Senecio paludosus, *Linn.*
Centaurea Calcitrapa, *Linn.*
C. solstitialis, *Linn.*
Arnoseris pusilla, *Gærtn.*
Crepis foetida, *Linn.*
C. paludosa, *Mænb.*
Sonchus palustris, *Linn.*
Campanula glomerata, *Linn.*
Schollera Occycoccus, *Roth.*
Statice auriculæfolia, *Vahl.*
S. reticulata, *Linn.*
Microcala filiformis, *Hoffm. & Link.*
Limnanthemum peltatum, *S. P. Gmel.*
Verbascum pulverulentum, *Vill.*
V. nigrum × *pulverulentum*
V. Lychnitis, *Linn.*
V. virgatum, *Stokes*
V. Blattaria, *Linn.*
Veronica triphyllos, *Linn.*
V. verna, *Linn.*
Bartsia serotina (*Reichb.*)
Melampyrum arvense, *Linn.*
Orobancha ramosa, *Linn.*
Utricularia intermedia, *Hayne*
Calamintha parviflora, *Linn.*
Marrubium vulgare, *Linn.*
Teucrium Scordium, *Linn.*
Herniaria glabra, *Linn.*

Scleranthus perennis, *Linn.*
Chenopodium Vulvaria, *Linn.*
C. ficifolium, *Sm.*
C. hybridum, *Linn.*
C. glaucum, *Linn.*
Atriplex pedunculata, *Linn.*
Salicornia radicans, *Sm.*
Polygonum Raii, *Bab.*
P. mite, *Schrank*
Daphne Mezereum, *Linn.*
Thesium humifusum, *D.C.*
Urtica Dodartii (*Linn.*)
Ceratophyllum demersum, *Linn.*
C. submersum, *Linn.*
Epipactis latifolia, *All.*
E. media, *Fr.*
E. atrorubens, *Schultz*
Orchis ustulata, *Linn.*
Herminium Monorchis, *R. Br.*
Gagea fascicularis, *Salis.*
Juncus acutus, *Linn.*
Scirpus cernuus, *Vahl.*
Carex divisa, *Huds.*
C. ligerica, *Gay*
C. limosa, *Linn.*
Phleum phalaroides, *Koel.*
Avena longifolia (*Parn.*)
Festuca procumbens, *Kunth.*
F. uniglumis, *Soland.*
F. arundinacea, *Schreb.*
Bromus erectus, *Huds.*
Agropyron acutum, *Roem. & Schult.*
A. junceum, *Beauv.*
Lepturus filiformis, *Linn.*
Asplenium acutum, *Poll.*
Lastrea cristata, *Presl.*
L. uliginosa, *Newman*

BRAMBLES AND ROSES (*Rubi and Rosæ*)

These two difficult and critical Genera do not appear to have been much studied in the county on the lines of modern arrangement and nomenclature.¹

The nomenclature of the *Rubi* has altered so much during the last few years that it seems better to disregard all old records and only to retain those which come from the hands of an eminent specialist, and have been brought up to date by him.

It is to be noticed that *Rubus Lintoni*, Focke, named after its discoverer, was first found at Sprowston in Norfolk, and that 'a hairy form of this distinct species has been found by the Rev. R. P. Murray and myself (Mr. Linton) in Somerset, but beyond this extension no further localities are known.'

¹ The writer gratefully avails himself of the kindness of the Rev. E. F. Linton, who allows him to make use of 'Norfolk Notes,' published by Mr. Linton in *Journal of Botany*, June and July, 1900 (vol. xxxviii. p. 208, 263), to sketch their distribution.

A HISTORY OF NORFOLK

Rubus Idæus, Linn.	E	NC	SC	W	Rubus hirtus, W. & N.				
— plicatus, W. & N.	E	NC			var. rotundifolius, Bab. . .	E			
— Rogersii, Linton	E				— tereticaulis, P. J. Muell. .	E			
— affinis, W. & N.	E				— dumetorum, W. & N.				
— incurvatus, Bab.	E				var. tuberculatus, Bab. . .	E			
— Lindleianus, Lees	E	NC			var. fasciculatus, P. J.				
— rhamnifolius, W. & N. . . .	E	NC	SC		Muell. <i>vide</i> Bab.	E			
— pulcherrimus, Neum.	E	NC			— corylifolius, Sm.				
— villicaulis,					usually a subulstris form .	E	NC	SC	
var. Selmeri.	E	NC			var. cyclophyllus, Lindeb.	E		SC	
— gratus, Focke	E				— cæsius, Linn.	E			
— rusticanus, Merc. (probably)	E	NC	SC	W	var. tenuis, Bell. Salt. <i>vide</i>				
— macrophyllus, W. & N.					Bab.	E			
aggregate.	E	NC		W	var. intermedius, Bab. . .		NC	SC	
var. Schlechtendahlii					Rosa spinosissima, Linn. . . .	E	NC	SC	W
(Weihe)	E				— tomentosa, Sm.	E		SC	W
var. amplificatus (Lees) . .	E	NC			var. scabriuscula (Sm.) . .	E			
— Sprengelii, Weihe	E				— rubiginosa, Linn.	E	NC		
— micans, Gren. & Godr. . . .	E				var. comosa, Rip.	E			
— pyramidalis, Kalt	E				— micrantha, Sm.	E			
— leucostachys, Sleich	E	NC			— obtusifolia, Desv.	E		SC	W
— Borceanus, Genev.	E				var. frondosa, Baker	E	NC	SC	
— mucronatus, Blox.	E				var. tomentella (Leman) . .	E	NC	SC	
— Gelertii, Frider	E				— canina, Linn.				
var. criniger, Linton	E	NC			var. lutetiana (Leman) . .	E	NC	SC	W
— radula, Weihe	E	NC			var. surculosa (Woods) . .	E			
var. echinatoides, Rogers . .	E				var. sphærica (Gren.) . . .	E	NC		
— echinatus, Lindl.	E				var. senticosa (Ach.) . . .	E			
— oigoclados, Muell. & Leff. .	E				var. dumalis (Bechst.) . .	E	NC	SC	W
— Babingtonii, Bell-Salt. . .	E				var. verticillacantha (Mérat)	E	NC		
— fuscus, W. & N.	E				var. Blondœana (Rip.) . .	E			
— pallidus, W. & N.	E				var. urbana (Leman) . . .	E		SC	W
— Lintoni, Focke	E				var. dumetorum (Thuill.) .	E		W	
— rosaceus,					var. arvatica, Baker . . .	E	NC	SC	W
var. hystrix, W. & N. . . .	E				var. Borreri (Woods) . . .	E			
— Koehleri,					— coriifolia, Fries.	E			
var. cognatus (N. E. Br.) .	E				— arvensis, Linn.	E	NC		W

MENTHÆ

The late Rev. Kirby Trimmer, who studied Norfolk botany for a great part of a long life, in his 'Supplement' to the *Flora of Norfolk*, gave a full account of the localities and distribution of this difficult genus (in which he was an acknowledged specialist) throughout the county; by which it will be seen that he found all the species but one (*M. pratensis*, Sole) and most of the varieties enumerated in the *London Catalogue of British Plants*, ed. 9. The dates of his observations range from 1835 to 1883.

The following table is compiled from the 'Supplement,' pp. 32-45:—

Mentha rotundifolia, Huds. . .	E	NC	SC	W	Mentha piperita, Linn.				
— alopecuroides, Hull	E	NC	SC		a. officinalis (Hull) . . .	E	NC	SC	
— longifolia, Huds.	E	NC	SC		b. vulgaris (Sole)	E		SC	
b. nemorosa	E	NC	SC		— pubescens, Willd.				
c. mollissima (Borkh.) . . .	E			W	a. palustris (Sole)		NC		
— viridis, Linn.	E	NC	SC	W	b. hircina (Hull)		NC		
'var. crispata'			SC		— hirsuta, Huds.	E	NC	SC	W

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Mentha hirsuta (<i>continued</i>)					Mentha gentilis (<i>continued</i>)				
b. subglabra (Baker)		NC	SC		b. Wirtgeniana (F. Schultz)	E	NC	SC	W
c. citrata (Ehr.)		NC			c. Pauliana (F. Schultz)	E		SC	W
— sativa, Linn.	E	NC	SC	W	— arvensis, Linn.	E	NC	SC	W
b. paludosa (Sole)			SC		b. Nummularia (Schreb.)	E	NC	SC	W
c. subglabra, Baker	E	NC	SC		c. agrestis (Sole)	E	NC		
— rubra, Sm.	E	NC	SC		d. præcox (Sole)	E	NC	SC	W
— gracilis, Sm.		NC			e. Allionii (Bor.)		NC	SC	W
b. cardiaca, Baker	E				— Pulegium, Linn.		NC	SC	
— gentilis, Linn.	E	NC	SC	W	b. erecta, Syme	E			

NAIADACEÆ

The county is very rich in this Order, both the 'Broad' country in the east and the 'Fen' land in the west giving unusually favourable habitats for it. The list has been most kindly corrected by Mr. Arthur Bennett, who is the acknowledged authority on the Order, and it contains *Naias marina*, discovered by him in 1883, and only known in Great Britain in the locality in which he found it.

NAIADACEÆ					Potamogeton zosteræfolius, Schum.	E			
Triglochin palustre, Linn.	E	NC	SC	W	— acutifolius, Link.	E	NC		W
— maritimum, Linn.	E	NC		W	b. major, Fieber	E			
Potamogeton natans, Linn.	E	NC	SC	W	— obtusifolius, Mert & Koch	E	NC	SC	W
— polygonifolius, Pour.	E	NC	SC	W	— Friesii, Rupr.	E	NC		
— coloratus, Hornem.	E		SC	W	— pusillus, Linn.	E	NC	SC	W
— alpinus, Balb.	E	NC	SC	W	b. tenuissimus, Koch	E	NC		
— heterophyllus, Schreb.	E		SC	W	— trichoides, Cham.	E	NC	SC	W
— lucens, Linn.	E	NC	SC	W	— pectinatus, Linn.	E	NC	SC	W
b. acuminatus, Fr.	E				— interruptus, Kit.	E			W
— decipiens, Nolte		NC			b. scoparius	E			W
— angustifolius, Presl.			SC		var. pseudo-marinus	E			
— prælongus, Wulf.	E	NC		W	Ruppia spiralis, Hartm.	E	NC		W
— perfoliatus, Linn.	E	NC	SC	W	— rostellata, Koch		NC		W
— crispus, Linn.	E	NC	SC	W	Zannichellia palustris, Linn.	E	NC	SC	W
b. serratus (Huds.)	E				— pedunculata, Reichb.		NC		W
— densus, Linn.	E	NC	SC	W	Zostera marina, Linn.	E	NC		W
					Naias marina, Linn.	E			

FILICES

EQUISETACEÆ, LYCOPODIACEÆ, MARSILEACEÆ

Ferns which can only grow on rocks are of course absent from the county, but their absence is made up for by the extraordinary abundance and variety of those species which are found in marshes. *Lastræa cristata* has certainly been found in all four divisions, though it is to be feared that in one of them, the North-Central, it is almost, if not quite, extinct. With it in some of its localities grows *L. uliginosa* and also *L. spinulosa*, but the last is common compared with the two former. In some of the marshes along the Bure and in the Broad country *L. Thelypteris* is as abundant as *Pteris aquilina* on the heath-land, and is mown and used like it for packing and rough litter. *Osmunda regalis* has been harried by collectors for sale until many of its clumps have disappeared ;

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it is however still tolerably widely distributed. In the North-Central division the Genus *Polystichum* is largely represented by a numerous series of forms varying from a *Lonchitidoid* form of a few inches high, sometimes fairly fruited, to a large sub-tripinnate form of *P. angulare*, of nearly as many feet in length ; in fact, there appears to be an almost unbroken succession of forms from the smallest to the largest, from the most simple to the most divided, and it is difficult to say when *P. lobatum* ends and *P. angulare* begins. This series of *Polystichum* is accompanied by a considerable quantity of *Scolopendrium vulgare*, which is otherwise a scarce fern throughout the county.

Asplenium viride has been found on a wall on the extreme southern edge of the Eastern division, and held its own for many years, until exterminated by structural alterations of its habitat. *Cystopteris fragilis* is known in one or two localities, and *Ceterach officinarum* in about twice as many.

Of *Equisetaceæ*, *E. maximum*, *E. sylvaticum*, and *E. hyemale* are the least common, and of Lycopods *Lycopodium Selago* is the rarest, recorded only from the North-Central division ; whilst *L. inundatum* and *L. clavatum* have not been recorded from the South-Central.

Pilularia globulifera has only been found in a very few localities, most of them in the Eastern division.

FILICES							
				<i>Lastrea spinulosa</i> , Presl. . . .	E	NC	SC
				— dilatata, Presl.	E	NC	SC
<i>Pteris aquilina</i> , Linn.	E	NC	SC	<i>Polypodium vulgare</i> , Linn. . . .	E	NC	SC
<i>Lomaria Spicant</i> , Desv.	E	NC		<i>Osmunda regalis</i> , Linn.	E	NC	SC
<i>Asplenium Adiantum-nigrum</i> , Linn.	E	NC	SC	<i>Ophioglossum vulgatum</i> , Linn. . .	E	NC	SC
var. <i>acutum</i> , Poll.				<i>Botrychium Lunaria</i> , Sw.	E	NC	SC
— <i>viride</i> , Huds. (extinct ?) . . .	E			EQUISETACEÆ			
— <i>Trichomanes</i> , Linn.	E	NC	SC	<i>Equisetum maximum</i> , Lam. . . .	E	NC	SC
— <i>Ruta-mutaria</i> , Linn.	E	NC	SC	— <i>arvense</i> , Linn.	E	NC	SC
<i>Athyrium Filix-fœmina</i> , Roth . .	E	NC		— <i>sylvaticum</i> , Linn.		NC	SC
<i>Ceterach officinarum</i> , Willd. . .	E	NC	SC	— <i>palustre</i> , Linn.	E	NC	SC
<i>Scolopendrium vulgare</i> , Symons. .	E	NC	SC	— <i>limosum</i> , Sm.	E	NC	SC
<i>Cystopteris fragilis</i> , Bernh. . .	E		SC	— <i>b. fluviatile</i> (Linn.)	E		
<i>Polystichum lobatum</i> , Presl. . .				— <i>hyemale</i> , Linn.	E	NC	
a. <i>genuinum</i> , Syme.	E	NC	SC	LYCOPODIACEÆ			
b. <i>aculeatum</i> , Syme.	E	NC	SC	<i>Lycopodium Selago</i> , Linn. . . .		NC	
— <i>angulare</i> , Presl.	E	NC	SC	— <i>inundatum</i> , Linn.	E	NC	
<i>Lastrea Thelypteris</i> , Presl. . . .	E	NC		— <i>clavatum</i> , Linn.	E	NC	
— <i>Oreopteris</i> , Presl.	E	NC		MARSILEACEÆ			
— <i>Filix-mas</i> , Presl.	E	NC	SC	<i>Pilularia globulifera</i> , Linn. . . .	E	NC	
— <i>cristata</i> , Presl.	E	NC	SC				
— <i>uliginosa</i> , Newman		NC	SC				

CHARACEÆ

The Characeæ of Norfolk merit special recognition and notice, inasmuch as the county stands first in the British Isles for the number of species which it yields. Twenty-five species are recorded for Great Britain ; of these no less than seventeen are found in Norfolk. Nor can it be claimed that this is a complete record. The Characeæ flora of the

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county has not received the attention which it deserves. Many districts are still waiting to be worked. From the subjoined census it will be seen that North-Central Norfolk has really not been touched, and there are other districts which would well repay a more careful investigation. *Tolypella intricata* must certainly occur in the county. *Chara baltica* may be reasonably looked for in the brackish waters of the broads, and *Nitella capitata* inhabits waters in Cambridgeshire which are in direct communication with Norfolk.

Before proceeding to give a tabulated list of the Norfolk Charads, it may be well to make a few observations regarding some of the rarer of its species.

C. connivens, Braun, confines itself to the sea coasts and brackish waters. It has been recorded from four localities only in England. Mr. Borrer's Herbarium at Kew contains a specimen collected at Stokes Bay, Gosport, in 1828. Fifty years afterwards it was found at Slapton Sands, South Devon. In 1889 it was collected by Mr. J. Bidgood in Heigham Sound, Norfolk, and in 1897 by the Rev. G. R. Bullock-Webster near Benacre Broad, Suffolk. It is a singularly fugitive plant, and probably a careful search in all the above-named stations would fail to discover it.

C. aspera, Willd., sub-species *desmacantha*, H. and J. Groves, grows in great profusion and in a characteristic form in the turf fens which surround the head waters of the Waveney. The plant occurs also in Hickling Broad and in the meres to the north of Thetford.

C. polyacantha, Braun, though a rare plant, and confined to seven counties in England, is abundant in the Norfolk broads. A specimen from Hickling Broad appears in Groves' *Characeæ Britannicæ Exsiccatae* (Fasc. i. 10), described by them as '*forma horrida*, Braun.' *C. polyacantha* is abundant in the Waveney fens, and it probably occurs in the Western area of the county, since it has been collected in west Suffolk in close proximity to the Norfolk border.

A *Chara* collected by Mr. H. Groves in Heigham Sound in 1884 was attributed by him and his brother to *C. papillosa*, Kuetz. (*Journal of Botany*, vol. xxiv., January, 1886). But a more familiar acquaintance with the plant, as its growth and development have been watched through successive years, has led them to the conclusion that it is a hybrid *C. hispida* and *C. contraria* (*vide* Fasc. ii. 42). It grows very freely in part of Hickling Broad, and produces globules and nucules.

C. hispida, Linn., grows very freely in Norfolk, and exhibits a remarkable variety of forms well meriting a closer attention.

C. canescens, Loisel., is a recent addition to the county. For many years its only known English habitat was Budock Pool, near Falmouth. In 1879 Mr. King discovered it in Dorsetshire, and five years later Mr. H. Groves collected it at the Lizard. A very wide addition to its area of distribution was made by Messrs. Salmon when, in 1896, they gathered it in two broads in east Suffolk. In 1899 it was found in Hickling Broad by Mr. Bullock-Webster. The special peculiarity of this species is the extreme rarity of the globule-bearing (male) plant,

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reproduction, in its absence, taking place by parthenogenesis. Like *C. connivens*, *C. canescens* confines itself to the neighbourhood of the sea.

Lychnothamnus stelliger, Braun, was unknown in England till it was discovered in Norfolk in 1880 by Mr. Arthur Bennett. It grows very freely in the broads and waterways of east Norfolk, often carpeting their bed for many square yards. A specimen from Heigham Sound is given in Groves' *Characeæ Brit. Exs.* (Fasc. i. 20) above referred to. In one other station only does it occur in the British Isles, at Slapton Sands, south Devon, where it was discovered by Mr. H. Groves in 1884. Its area of distribution through Europe is wide, in spite of its rarity. It is found in Germany, Russia, Austro-Hungary, Finland, Sweden, Belgium, France and Italy.

Tolypella glomerata, Leonh., is the commonest of the Tolypellas. It grows in great abundance in the fenland districts in the western division of the county, especially in the season following the cleaning out of some ditch or drain. The Characeæ are singularly sensitive of any intrusion by other plants, and if they are not allowed to occupy the whole ground generally retire altogether.

T. prolifera, Leonh., is a rare and fickle plant. A few small specimens were discovered in the Gillingham marshes, east Norfolk, in 1898 by Mr. Bullock-Webster. In the west of the county it occurred in fine condition on the Norfolk side of the Little Ouse in the same year. In Professor C. C. Babington's *Memorials* (Macmillan, 1897), p. 321, is a letter written by him to Mr. Borrer, in which he mentions that Mr. Newbould had found *T. prolifera* 'between Creeke and Burnham, Norfolk, in 1851.' This would be a record for the North-Central district of the county. But the statement cannot be safely accepted unless the specimen referred to could be examined. The Characeæ were so little studied and systematized till Messrs. Groves issued their 'Review of the British Characeæ' (*Journal of Botany*, April, 1880, etc.) that any records unidentified by them must be in most cases rejected.

The discovery of *Nitella tenuissima*, Kuetz., in Norfolk in 1897 is of special interest. It was first observed in England so far back as 1829, when Professor Henslow collected specimens in Wicken Fen, Cambridge-shire, and in this original station it is to be found still in great abundance, if the season be a favourable one. Fifty-three years afterwards a second station was added when Mr. J. E. Griffiths discovered it in Anglesea. In 1897 it was found in small quantities in Lopham Fen, Norfolk, by Mr. Bullock-Webster, and these three localities are at present its only known habitats in England. It has been found in Ireland, and is reported from Germany, Austro-Hungary, and Switzerland.

N. mucronata, Kuetz., is a singularly fugitive plant. It seems never to occur in the same station two seasons together. It was first observed in England by Mr. Borrer, in the early part of the century, in west Sussex, but it has not been collected there since. In 1873 it was found in the Fleet Pool, north Hants. In 1882 it was found in the Ouse at Bedford, and Mr. James Sanders has since observed it in the Ivel

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in the same county. In 1892 Mr. Druce found it in abundance near Godstowe, Oxfordshire, but it does not seem to have occurred in that station since. In 1896 Mr. Bullock-Webster collected it in some clay-pits near Ely, and the following year on the Norfolk side of the river Little Ouse near St. John's, Little Ouse. It has been recorded from no other county in the British Isles.

N. flexilis, Agardh, seems pretty well established in Fowl Mere, near Thetford, and has also been found on the Norfolk side of the Little Ouse. A curious *Nitella* which occurs in the Counterwash Drain at Welney, west Norfolk, as well as higher up this drain in Cambridgeshire, Messrs. Groves, after much consideration and investigation, assign to *N. flexilis* var. *nidifica*, Wallm., though it differs considerably from the type (*vide* Fasc. ii. 59).

N. opaca, Agardh, is a common plant distributed through no less than seventy-three vice-counties of the British Isles, but it does not seem to have been collected from many localities in Norfolk.

There is still much to be done before the county distribution of these interesting plants can be at all accurately estimated. The Order is one which is much neglected by botanists. Possibly the difficulty of collecting and preserving Charas in a measure accounts for this. They never appear above the water, nor will they bear any lengthened exposure to the air. It is necessary to transfer them from the water to an airtight vasculum with all speed. Many of the species, too, are exceedingly brittle and delicate, and require very tender handling, indeed in the case of the *Tolypellas* it is almost necessary to transfer the plants straight from the water to the pressing-case if really good specimens are to be secured. In deep waters it is necessary to use a drag, but preference should be given to a long-handled hoe where possible. A hoe makes it practicable to secure the plant by the root, and the root is generally the toughest part of a Charad for handling purposes. A drag is apt to break and tear the specimen. For plants within reach the hand is by far the best collector. Most of the species require to be floated out under water, and to be transferred to their paper in this condition, they are then placed between ample sheets of drying paper, and under as strong a pressure as can be obtained. After three or four changes of drying paper, and three or four days' pressure, they are ready for the herbarium.

Nitella capitata is the earliest of the Charads to show itself. It may be found in good condition towards the end of April. *Tolypella intricata* and *T. glomerata* are a week or two later, whilst *T. prolifera* may be expected in its prime in the middle of June. *Nitella flexilis* and *N. opaca* are at their best about the same time. *N. translucens* and *N. tenuissima* are somewhat later, whilst *N. mucronata* is a summer plant.

The Charas are less variable in their season. They are almost all in a fruiting condition towards the end of June, and may be collected thence onwards during July and August.

The variations and forms of the Characeæ are innumerable, affected as they are by the water in which they grow, its quality and character,

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its bed soil, its temperature, its depth, its flow. A large herbarium may be made of these varying forms.

The Characeæ have, as has been said before, one determined characteristic. They object to share their home with any other plant. 'All or nothing' is their maxim. As soon as other aquatics begin to assert their existence in the ditch, drain or pool, occupied by Charas they retire, and only appear again when spade and shovel have effected a thorough cleaning out of the old home.

The plants recorded in the following census have been verified by Messrs. H. and J. Groves, to whose labours and investigations we owe almost all that English botanists know of this interesting Order of submerged aquatics.

DISTRIBUTION OF CHARACEÆ IN NORFOLK

Chara fragilis, Desv.	E	SC	W	Chara vulgaris (<i>continued</i>)			
var. Hedwigii, Kuetz.	E		W	var. longibracteata, Kuetz.	E	SC	W
var. delicatula, Braun.	E			var. papillata, Wallr.	E		
— connivens, Braun.	E			— canescens, Loisel.	E		
— aspera, Willd.	E	SC		Lychnothamnus stelliger, Braun.	E		
var. desmacantha, H. & J.				Tolypella glomerata, Leonh.	E	SC	W
Groves	E	SC		— prolifera, Leonh.	E		W
— polyacantha, Braun.	E	SC		Nitella tenuissima, Kuetz.		SC	
— papillosa, Kuetz.	? E			— mucronata, Kuetz.			W
— contraria, Kuetz.	E	SC		— translucens, Agardh.	E		
— hispida, Linn.	E	SC	W	— flexilis, Agardh.		SC	W
— vulgaris, Linn.	E	SC	W	— opaca, Agardh.	E		

MOSSES (*Musci*)

The literature relating to the mosses of Norfolk is extremely scanty. It is confined, indeed, as far as can be ascertained, almost solely to the following three lists :—

(1) A list of mosses, with localities, in the *Sketch of the Natural History of Yarmouth and its Neighbourhood*, by C. J. and James Paget, 1834.

(2) An unlocalised list of species in the Rev. Geo. Munford's *List of the Botanical Productions known or reported to inhabit the County of Norfolk*, 1864.

(3) A similar list by Miss A. M. Barnard, compiled for Geldart's article on Botany in Mason's *History of Norfolk*.

The two later lists are based very greatly on the first ; and Miss Barnard's list, though compiled many years later, adds very little to what is already recorded in the others ; for practical purposes we may therefore say that during the latter half of the century bryological investigation has been at a standstill. In fact, with the exception of a few scattered records, the only available material additional to these lists consists of two or three collections made within the last year or two, viz. : (a) A list of mosses collected in east Norfolk, in 1898 and 1899, by Mr. W. H. Burrell, comprising about 50 species. (b) A collection of about 30 species (kindly made for the purposes of this article) principally from the neighbourhood of Hunstanton, by Mr J. W. Bodger, in 1900. (c) A collection similarly made by Mr. E. M. Holmes, mostly in the neighbourhood of Holt, in

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1900, including about 50 species. The writer is greatly indebted to the above-named gentlemen for their assistance, as well as to Mr. H. D. Geldart, Mr. Clement Reid and others for help given in various ways.

It will readily be understood from the foregoing that our knowledge of the bryology of the county is sadly incomplete. In the early part of the century the galaxy of scientific names that brought Norfolk, botanically speaking, into the forefront of the English counties included several bryologists of great ability and repute, among whom may be named Sir W. J. Hooker, Sir J. E. Smith, Dickson, Dawson Turner, T. Palgrave, Rev. G. R. Leathes and F. K. Eagle. And it is probable that at that time scarcely any English county had had its mosses more carefully studied. During the time that has since elapsed the study of bryology has made immense advances, owing to the labours especially of W. Wilson in this country, and of Schimper, Lindberg and many others on the continent. Unhappily the study in our county has not only failed to keep pace with this advance, but has been absolutely at a standstill, and now it must be confessed that there are few counties about which our recent bryological information is so inadequate.

The collections lately made and referred to above have, it is true, added considerably to our knowledge, but it is obvious that rapidly made gatherings by independent workers must result in much duplication of records, and the number of species thus recorded for a district will always be inconsiderable in proportion to the number of specimens obtained, when compared with what may be done by systematic observation by even a single resident worker acquainted with what has been already accomplished by previous botanists.

The total number of species known from Norfolk, when all the above sources are collated, amounts to about 170, a very inadequate list when the variety of surface of the county and the natural advantages afforded by its physiography are taken into account. It is true that the atmospheric humidity, so favourable to moss-life, which is found in the more mountainous western districts is here wanting; and the entire absence of anything like hard rock naturally exposed prevents the occurrence of a large number of species; but in spite of these disadvantages the district is one that might be expected to yield a good number of mosses. The long stretches of sand by the coast, the numerous Sphagnum bogs, the extensive sandy heaths, the marshy lands by the broads, the strip of fenland on the west, are all habitats favourable to moss-life; and it may confidently be predicted that systematic investigation would not only add considerably to our present list, but would bring Norfolk well into the foremost rank of at least the lowland counties of England.

It is a noteworthy fact that several of our British mosses were first recorded in Norfolk, the most interesting instance of the kind being that of *Buxbaumia aphylla*. This extraordinary moss, which seems to run counter to every rule of the economy of moss-life, was first discovered in a fir plantation at Sprowston near Norwich, by Sir W. J. Hooker, in

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1806. Anomalous in its almost entire lack of vegetative organs and in the structure of its peristome, so eccentric in its appearance as to have been taken at one time for a fungus, quaint and almost comical in its lop-sided capsule, wayward in its habit of making an appearance for a few brief months in a spot and then entirely disappearing, it seems, like the pigmies and giants among mankind, to be a remnant of a forgotten and semi-fabulous race. It was first discovered in 1712, near Astracan, by Buxbaum, who writes : ' I wished to follow the example of Marchanti, and make it into a new genus and name it after my father, but called to mind the fox, who was derided by the others, because he begged the grapes, not for himself, but for his sick mother.'¹

This curious plant does not appear to have been found again in Norfolk since its first discovery nearly a century ago.

Polytrichum aloides var. *Dicksoni* (Turn.), again, which was first described by Turner (as a species, *P. Dicksoni*) from specimens gathered 'near Yarmouth' by Dickson, is another example.

Among the mosses collected by Mr. Holmes, at Sherringham, was a curious little Hypnum, which proves to be *H. polygamum* var. *minus*, Schp., a very distinct variety hitherto unrecorded from Great Britain, differing widely in habit from the typical plant, and very closely resembling *H. chrysophyllum*, from which, indeed, it is scarcely distinguishable except by the different inflorescence.

Another moss to which some local interest attaches is *Racomitrium lanuginosum*. This is usually an inhabitant of mountain rocks, and certainly is one that we should hardly look for in East Anglia. Hooker, however, in Smith's *English Flora* writes of it : ' On mountains, abundant ; rare on heaths in the plains, as in Norfolk, Rev. James Layton.' Some slight doubt has been cast on this record, it being suggested that it refers to *Rbac. canescens*, a species more or less frequent in the county ; but it seems scarcely likely that Hooker would have accepted a record of an admittedly unexpected occurrence except on trustworthy evidence.

A very interesting plant was gathered by Mr. Burrell at Beeston Regis in 1898, about which some doubt has arisen as to whether it should be referred to *Funaria hygrometrica*, one of the commonest, or to *F. microstoma*, one of the rarest of British mosses. In a letter to the writer, Mr. E. Ch. Horrell, to whom it was at first submitted, says, ' Inner peristome very thin and much smaller than in *F. hygrometrica*, but is larger than that of *F. microstoma*, as figured in your Handbook and in the *Bry. Eur.*, and of different appearance. Spores average 22μ , Limpricht gives *hygrometrica* $13-16\mu$, and *microstoma* $26-32\mu$.' Careful examination by other bryologists confirmed these observations. The conclusion seems to be forced upon us that the Norfolk plant is intermediate between the two species, though undoubtedly nearer *F. microstoma* ; and this view is supported by a somewhat similar plant gathered by Mr. E. M. Holmes on Copthorne Common, Sussex, in the

¹ Braithwaite, *Brit. Moss Flora*, i. 19.

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same year ; this, however, was decidedly nearer to *F. hygrometrica*, though presenting certain characters indicating an approach to the rarer species. It is interesting in the taxonomic study of mosses to find two forms so clearly uniting such apparently well-marked species as *F. hygrometrica* and *F. microstoma*.

Another rare plant, gathered by Mr. Holmes in a bog near Holt, is *Philonotis cæspitosa*, Wils., a species (or sub-species) which differs from *P. fontana* mainly in having the bracts of the male inflorescence acute instead of obtuse and rounded. The inflorescence is rarely produced, but was present in Mr. Holmes' plant, and showed the bracts very markedly tapering and acute, much more so than in Wilson's own specimens. The specimen is therefore of special interest, as tending to support the view, held by some continental writers, that *P. cæspitosa* is one of a series of intergrading forms connecting *P. fontana* and *P. marchica*, the latter a species not at present recorded from Britain.

Some reference should be made to what is known of the mosses that occur in the county in the plant deposits of prehistoric times. The structure of the Cellular Cryptogams renders them peculiarly liable to destruction as compared with the higher Vascular plants ; hence they are scarcely found in the earlier formations, or indeed so far back as Tertiary times ; and even as regards the later deposits very little has been done towards identifying these lower plants, of which however there must be considerable remains in some of the Plant Beds in which East Anglia is rich. So long ago as 1872 Nathorst detected in the Arctic bed at Mundesley a single moss, *Hypnum turgescens*, Schpr. ; a very interesting discovery since that species does not occur at the present day in Britain, though distributed sparingly throughout central and arctic Europe. Quite recently the writer has had the opportunity of examining some material from the same Arctic or Early Glacial beds at Mundesley, which contained considerable remains of this species, and of several others, some of great interest. Among these was a mere fragment of what appears to be undoubtedly *Hypnum capillifolium*, Warnst., a rare moss, found in scattered localities throughout the temperate zone of the northern hemisphere in both the old and new worlds, but not recorded hitherto from Great Britain. A third species, *Hypnum Richardsoni*, Mitt. (*H. Breidleri*, Jur.), is also of special interest, as with a somewhat similar distribution to that of the two foregoing species it does not exist in Britain at the present day. It seems probable that further study of the mosses of these Plant Beds of Glacial times may add something to our knowledge of the origin and relationships of our island flora.

LIST OF SOME OF THE RARER SPECIES AND VARIETIES

The greater number of the Sphagna or peat-mosses recently collected have been submitted to Mr. E. Ch. Horrell, who has named them in accordance with the most recent views as represented by Warnstorff, and as this is a somewhat new departure I give the list *in extenso*.

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- | | |
|---|--|
| <p> <i>Sphagnum subnitens</i>, Russ. and Warnst. var.
 <i>violascens</i>, Warnst.
 — <i>rubellum</i>, Warnst.
 — <i>parvifolium</i>, Warnst.
 — <i>squarrosum</i> var. <i>subsquarrosum</i>, Russ.
 — <i>medium</i>, Limpr. var. <i>violascens</i>, Warnst.
 — <i>papillosum</i>, Lindb. var. <i>normale</i>, Warnst.
 — <i>tenellum</i>, Ehrh.
 — <i>intermedium</i>, Hoffm.
 — <i>cuspidatum</i>, Ehrh.
 <i>Buxbaumia aphylla</i>, L.
 <i>Polytrichum aloides</i> var. <i>Dicksoni</i>, Wallm.
 <i>Campylopus brevipilus</i>, B. and S.
 <i>Fissidens decipiens</i>, De Not.
 <i>Racomitrium lanuginosum</i>, Brid.
 — <i>canescens</i>, Brid.
 <i>Phascum cuspidatum</i> var. <i>piliferum</i>, Hook.
 and Tayl.
 <i>Pottia recta</i>, Mitt.
 — <i>bryoides</i>, Mitt.
 — <i>Starkeana</i>, C. Müll.
 — <i>Heimii</i>, Fühnr.
 <i>Tortula marginata</i>, Spr.
 — <i>rigida</i>, Schrad.
 — <i>ruraliformis</i>, Dixon
 <i>Trichostomum flavovirens</i>, Bruch
 <i>Ulota crispa</i>, Brid. </p> | <p> <i>Ulota phyllantha</i>, Brid.
 — <i>Hutchinsiae</i>, Hamm.
 <i>Physcomitrella patens</i>, B. and S.
 <i>Splachnum ampullaceum</i>, L.
 <i>Amblyodon dealbatus</i>, P. Beauv.
 <i>Philonotis cæspitosa</i>, Wils.
 <i>Bryum lacustre</i>, Brid.
 — <i>pendulum</i>, Schp.
 — <i>turbinatum</i>, Schwgr.
 <i>Mnium affine</i> var. <i>rugicum</i>, B. and S.
 — <i>subglobosum</i>, B. and S.
 <i>Pterygophyllum lucens</i>, Brid.
 <i>Antitrichia curtipendula</i>, Brid.
 <i>Camptothecium nitens</i>, Schp.
 <i>Brachythecium glareosum</i>, B. and S.
 — <i>plumosum</i>, B. and S.
 <i>Eurhynchium abbreviatum</i>, Schp.
 — <i>pumilum</i>, Schp.
 <i>Hypnum polygamum</i>, var. <i>minus</i>, Schp.
 — <i>lycopodioides</i>, Schwgr.
 — <i>vernicosum</i>, Lindb.
 — <i>uncinatum</i>, Hedw.
 — <i>scorpioides</i>, L.
 — <i>cordifolium</i>, Hedw.
 — <i>giganteum</i>, Schp.
 — <i>stramineum</i>, Dicks.
 <i>Hylocomium rugosum</i>, De Not. </p> |
|---|--|

LIVERWORTS (*Hepaticæ*)

The history of botanical research in Norfolk as regards the Hepatics or liverworts is on very parallel lines with that of the mosses. Briefly put it attained a brilliant position in the early part of the century and has been dormant ever since. This branch of botany found, in addition to Hooker, Dawson Turner, etc., an indefatigable worker in the Rev. R. B. Francis of Holt, whose careful search resulted in the discovery for the first time in Britain of several species, and whose name has been commemorated by Hooker in the *British Jungermannia* in the following terms: ‘*Jung. Francisci*, Hook. About Holt and Edgefield. I gladly take the opportunity of distinguishing the present species by the name of its discoverer, my friend the Rev. R. B. Francis, who has so successfully investigated the vicinity of his residence in search of the plants of this genus, and has so kindly and liberally communicated to me numerous specimens and much valuable information respecting them.’ This species is now known as *Cephalozia Francisci*. Other discoveries of the same botanist were *C. divaricata* (Sm.), *Lophocolea heterophylla* (Schrad.), *Jung. gracilis* (Schleich.), and *J. exsecta* (Schmid.), all of which were first recorded in Britain by this keen-sighted observer.

The number of species at present recorded for the county falls short of 45, which, out of a total of 220 as given in the most recent catalogue, can only be considered as very inadequately representing the real distribution of these plants.

The writer is much indebted to Mr. W. H. Pearson for placing at

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his disposal the material in his possession, as well as for making extracts of all Norfolk records from the *Brit. Jungermannia*.

MARINE ALGÆ

The coast of Norfolk, consisting almost entirely of sandy or muddy shores and having nothing that can be called 'rocks' excepting a few reefs of large stones or a hard chalk floor, produces but few growing species. Many of the weeds brought up are water-borne, their condition often showing that they have come long distances. There is also no deep water close in shore, and these causes perhaps account for the absence from our list of *Laminaria digitata* and *L. bulbosa*, both of them large and conspicuous species which could hardly have escaped notice. The spinous section of the genus *Ceramium*, viz. *C. echionotum*, *C. acanthonotum* and *C. ciliatum*, is also absent though carefully searched for. The writer has never been able to find even a fragment of any one of them.

The late Dawson Turner of Yarmouth, in the *Historia Fucorum* (vol. ii. p. 84), alludes to Lilly Wigg, a Yarmouth botanist, as the discoverer of seven species of 'Fuci,' as they were then called, viz. : *F. (Delesseria) hypoglossum*, (*D.*) *ruscifolius*, (*Laurencia*) *dasyphyllus*, (*Rhodomela*) *subfuscus*, (*Chrysemenia*) *clavellus*, (*Bonnemaisonia*) *asparagoides*, and (*Naccaria*) *Wiggii*; and also of *Ulva (Cutleria) multifida*, *Conferva (Ectocarpus) Mertensii*, *C. (Callithamnion) rosea*, and *C. (Polysiphonia) stricta*, which last is said, in the synopsis of *Phycologia Britannica*, to be the young state of *Polysiphonia formosa*.

Sargassum vulgare, which, as Harvey writes,¹ has 'no just claim on our Flora,' recorded by Paget, has been omitted. Three other species have been recorded as only occurring once and may be regarded as 'casuals': *Fucus canaliculatus*, *Cystoseira granulata* and *Conferva collabens*. A few more species seem doubtful or uncertain, such as *Cystoseira barbata*, *Ectocarpus brachiatus* and *Cladophora diffusa*.

The nature of our subject prevents any attempt at 'distribution' of the species recorded. It is true that sometimes for a few days of very fine weather certain species of Algæ will be found to come ashore at definite spots day after day, showing their place of growth to be on submarine reefs in the vicinity; but one rough tide will alter all this, and not a single fresh specimen will occur even for weeks afterwards on the same beach.

The nomenclature and arrangement followed are, so far as the writer can make them by comparison of synonyms, those of Harvey's *Phycologia Britannica*.²

¹ *Man*, ed. 2, p. 15.

² This list contains but one addition, *Bryopsis hypnoides* (found at Cromer last year), to that published in the *Transactions of the Norfolk and Norwich Naturalists' Society* (vol. iii. p. 532, 1883). The principal authorities on the subject are C. J. and James (Sir) Paget, *Nat. Hist. of Yarmouth*, 1834, and a list drawn up by the Rev. G. Mumford for White's *History of Norfolk*, 1864. There are also various Norfolk localities mentioned in Harvey's *Phycologia Britannica*.

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MELANOSPERMEÆ

FUCACEÆ

- Halidrys siliquosa*, Lyngb.
- Cystoseira ericoides*, Ag.
- *granulata*, Ag.
- *barbata*, Ag.
- *fibrosa*, Ag.
- Pycnophycus tuberculatus*, Kütz.
- Fucus vesiculosus*, Linn.
- *ceranoides*, Linn.
- *serratus*, Linn.
- *nodosus*, Linn.
- *canaliculatus*, Linn.
- Himanthalia lorea*

SPOROCHNACEÆ

- Desmarestia ligulata*, La.
- *aculeata*, La.
- *viridis*, La.
- Arthrocladia villosa*, Duby.
- Sporochnus pedunculatus*, Ag.

LAMINARIACEÆ

- Alaria esculenta*, Grev.
- Laminaria saccharina*, La.
- *phyllitis*, La.
- Chorda filum*, La.

DICTYOTACEÆ

- Cutleria multifida*, Grev.
- Taonia atomaria*, Grev.
- Dictyota dichotoma*, La.
- Punctaria latifolia*, Grev.
- *plantaginea*, Grev.
- Asperococcus echinatus*, Grev.

CHORDARIACEÆ

- Chordaria flagelliformis*, Ag.
- Mesogloia virescens*, Carm.
- Elachista fucicola*, Fries.
- *scutulata*, Duby.
- *velutina*, Fries.
- Myrionema strangulans*, Grev.

ECTOCARPACEÆ

- Cladostephus verticillatus*, Ag.
- *spongiosus*, Ag.
- Sphacelaria scoparia*, Lyngb.
- *cirrrosa*, Ag.
- Ectocarpus siliculosus*, Lyngb.
- *fasciculatus*, Harv.
- *tomentosus*, Lyngb.
- *litoralis*, Lyngb.
- *granulosus*, Ag.
- *brachiatus*, Harv.
- *mertensii*, Ag.
- Myriotrichia filiformis*, Harv.

RHODOSPERMEÆ

RHODOMELACEÆ

- Rhodomela lycopodioides*, Ag.
- *subfusca*, Ag.
- Bostrychia scorpioides*, Mont.
- Rytidhla pinastroides*, Ag.

RHODOMELACEÆ (continued)—

- Rytidhla thuyoides*, Harv.
- Polysiphonia urceolata*, Grev.
- *formosa*, Suhr.
- *elongata*, Grev.
- *fibrillosa*, Grev.
- *nigrescens*, Grev.
- *atrorubescens*, Grev.
- *furcellara*, Harv.
- *fastigiata*, Grev.
- *byssoides*, Grev.
- Dasya coccinea*, Ag.

LAURENCIACEÆ

- Bonnemaïsonia asparagoides*, Ag.
- Laurencia pinnatifida*, Lamour.
- *dasyphylla*, Grev.
- Chrysemenia clavellosa*, J. Ag.
- Chylocladia ovalis*, Hook.
- *kaliformis*, Hook.
- *articulata*, Grev.

CORALLINACEÆ

- Corallina officinalis*, Linn.
- Jania rubens*, Lamour.

DELESSERIACEÆ

- Delesseria sanguinea*, Lamour.
- *sinuosa*, Lamour.
- *alata*, Lamour.
- *hypoglossum*, Ag.
- *ruscifolia*, Lamour.
- Nitophyllum punctatum*, Grev.
- *gmelini*, Grev.
- *laceratum*, Grev.
- *uncinatum*, J.E.G.
- Plocamium coccineum*, Lyngb.

RHODYMENIACEÆ

- Rhodymenia bifida*, Grev.
- *laciniata*, Grev.
- *palmetta*, Grev.
- *ciliata*, Grev.
- *jubata*, Grev.
- *palmata*, Grev.
- Gracilaria confervoides*, Grev.
- Hypnea purpurascens*, Harv.

CRYPTOMENIACEÆ

- Gelidium corneum*, Lamour.
- *var. crinale*
- Chondrus crispus*, Lyngb.
- Phyllophora rubens*, Grev.
- *membranifolia*, J. Ag.
- Gymnogongrus plicatus*, Kg.
- Polyides rotundus*, Grev.
- Furcellaria fastigiata*, Lamour.
- Dumontia filiformis*, Grev.
- Halymenia ligulata*, Ag.
- Ginnania furcellata*, Mont.
- Naccaria Wiggii*, End.

CERAMIACEÆ

- Ptilota plumosa*, Ag.
- *sericea*, Gmel.
- Ceramium rubrum*, Ag.

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CERAMIACEÆ (continued)—

- Ceramium diaphanum, Roth.
- gracillimum, Griff. and Harv.
- nodosum, Kütz.
- Griffithsia equisetifolia, Ag.
- simplicifilum, Ag.
- setacea, Ag.
- Callithamnion plumula, Lyngb.
- turneri, Ag.
- pluma, Ag.
- tetricum, Ag.
- hookeri, Ag.
- roseum, Lyngb.
- byssoideum, Arn.
- polyspermum, Ag.
- fasciculatum, Harv.
- borneri, Ag.
- thuyoideum, Ag.
- pedicellatum, Ag.
- rothii, Lyngb.
- daviesii, Lyngb.

CHLOROSPERMEÆ

SIPHONACEÆ

- Bryopsis plumosa, Ag.
- hypnoides, Lamour.
- Cladophora pellucida, Kütz.
- diffusa, Harv.
- rupestris, Kg.
- lætevirens, Kütz.
- flexuosa, Griff.

SIPHONACEÆ (continued)—

- Cladophora gracilis, Griff.
- refracta, Kütz.
- albida, Kütz.
- lanosa, Kütz.
- arcta, Kütz.
- flavescens, Kg.
- fracta, Kg.
- Rhizoclonium riparium, Kütz.
- Conferva linum, Roth.
- tortuosa, Dillw.
- melagonium, Web. and Mohr.
- ærea, Dillw.
- collabens, Ag.
- youngana, Dillw.
- Enteromorpha cornucopiæ, Hook.
- intestinalis, Link.
- compressa, Grev.
- clathrata, Grev.
- percursa, Hook.
- Ulva latissima, Linn.
- lactuca, Linn.
- linza, Linn.
- Porphyra lacinata, Ag.
- vulgaris, Ag.
- Bangia fusco-purpurea, Lyngb.

OSCILLATORIAEÆ

- Rivularia atra, Roth.
- Calothrix confervicola, Ag.
- scopulorum, Ag.
- Lyngbya flacca, Harv.

DIATOMACEÆ

This extensive and interesting Order has received much attention in Norfolk having been studied for many years by Thomas Brightwell, R. Wigham, J. Bleakley, H. G. Glasspoole and W. K. Bridgeman and others, and especially by Frederic Kitton, Hon. F.R.M.S., a specialist of more than European fame. Mr. Kitton published papers on the distribution of this Order in the county in the *Transactions of the Norfolk and Norwich Naturalists' Society*, and he drew up a complete list for Mason's *History of Norfolk* in which he enumerated 65 genera and 310 species with full account of the localities in which they had been found, which may be summarized as follows :

‘The system of classification adopted is, with a few slight exceptions, that of Prof. H. L. Smith, of New York.’

Amphora, Ehrenberg	6 species	Amphipleura, Kützting	1 species
Cocconema „	4 „	Schizonema, Agardh	3 „
Cymbella, Agardh	2 „	Colletonema, Brebisson	3 „
Encyonema, Kützting	2 „	Berkeleya, Greville	1 „
Mastogloia, Thwaites	3 „	Stictodesmis „	1 „
Navicula, Ehrenberg	72 „	Amphiprora, Ehrenberg	6 „
Scoliopleura, Grunow	3 „	Pleurosigma, Smith	14 „
Brebissonia „	1 „	Toxonidea, Donkin	2 „
Stauroneis, Ehrenberg	8 „	Rhoikosphenia, Grunow	1 „

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Gomphonema, Agardh	7 species	Nitzschia, Hassell	22 species
Achnanthes, Bory	5 "	Hantzschia, Grunow	4 "
Achnanthidium, Kützing	1 "	Surirella, Turpin	14 "
Cocconeis, Ehrenberg	3 "	Campylodiscus, Ehrenberg	5 "
Campyloneis, Grunow	1 "	Rhizosolenia "	5 "
Anarthoneis "	1 "	Ditylum, Bailey	1 "
Epithemia, Kützing	7 "	Chætoceros, Ehrenberg	3 "
Eunotia, Ehrenberg	5 "	Melosira, Agardh.	6 "
Meridion, Agardh.	1 "	Liparogyræ, Ehrenberg	1 "
Glyphodesmis, Grunow.	1 "	Isthmia, Agardh.	1 "
Rhaphoneis, Ehrenberg.	2 "	Eucampia, Ehrenberg	3 "
Asterionella, Hassell.	3 "	Biddulphia, Grey	4 "
Synedra, Ehrenberg.	11 "	Triceratium, Ehrenberg	3 "
Sceptroneis "	1 "	Amphitetras "	1 "
Fragilaria, Lyngbye.	10 "	Lithodesmium "	1 "
Campylosira, Grunow	1 "	Eupodiscus "	1 "
Licmophora, Agardh	2 "	Auliscus "	1 "
Diatoma, Decandolle	3 "	Actynoptychus "	2 "
Denticula, Kützing	1 "	Hyalodiscus "	1 "
Tabellaria, Ehrenberg	2 "	Cyclotella, Kützing	9 "
Grammatophora "	2 "	Actinocyclus, Ehrenberg	4 "
Striatella, Agardh	1 "	Coscinodiscus "	7 "
Rhabdonema, Kützing	2 "	Palmeria, Greville	2 "
Cymatopleura, Smith	3 "		

LICHENS (*Lichenes*)

COLLEMACEI, NYL.

COLLEMEI, Nyl.

- Collema tenax, Ach. *Runton and Cromer*
- cheileum, Ach. *Thetford*
- Collemodium Schraderi, Nyl. *Caistor Church*
- Leptogium tenuissimum, Koerb. *Near Norwich and Yarmouth*
- subtile, Nyl. *Coltishall*
- lacerum, sub. sp. pulvinatum, Nyl. *Cromer*
- scotinum, var. sinuatum, Malbr. *Caistor*
- palmatum, Mont. *Yarmouth and Hemsby*

LICHENACEI, NYL.

CALICIEI, Nyl.

- Sphinctrina turbinata, Fr. *Yarmouth*
- anglica, Nyl. *Caistor*
- Calcium chrysocephalum, Ach. *Framingham-Earl*
- phæocephalum, T. and B. *Lakenham*
- melanophæum, var. ferrugineum, Schær. *Framingham-Earl*
- quercinum, Pers. *Lakenham*
- hyperellum, Ach. *Earsham and Acle*
- curtum, T. and B. *Norwich*
- trachelinum, Ach. *Earsham*
- var. xylonellum, Nyl. *Framingham*
- Trachylia tigillaris, Fr. *Near Yarmouth*
- tympanella, Fr. *Earsham and Yarmouth*
- Coniocybe furfuracea, Ach. *North Wootton*

BÆOMYCETEI, Nyl.

- Bæomyces rufus, D. C. *Near Norwich*
- roseus, Pers. *Thetford Warren*

CLADONIEI, Nyl.

- Pycnothelia papillaria, Duf. *Mousehold Heath, Norwich*
- Cladonia endiviæfolia, Fr. *Hemsby*
- alcornis, Flk. *Hunstanton*
- pyxidata, Fr. (Frequent, sterile)
- var. chlorophæa, Flk. *Wootton Common*
- fimbriata, Fr., var. radiata, Nyl. *Near Norwich*
- gracilis, Hoffm. *Wootton Common*
- degenerans, Flk., var. anomæa, Flk. *Lakenham*
- furcata, Hoffm. (Only sterile)
- pungens, Flk. *Thetford and near Hemsby*
- cæspititia, Flk. *North Wootton*
- delicata, Flk. *Edgefield*
- coccifera, Schær. (Only sterile)
- Cladina sylvatica, Nyl. *North Wootton Common*
- uncialis, Nyl. *Near Yarmouth*

RAMALINEI, Nyl.

- Ramalina calicaris, Nyl. *Near Norwich*
- fraxinea, Ach. *Holt*
- pollinaria, Ach.; form humilis, Ach. *Holt and near Norwich*
- fastigiata, Ach. *Holt*
- farinacea, Ach. *Kings Lynn and Lakenham*

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ALECTORIEI, Nyl.

Alectoria chalybeiformis, Nyl. *Thetford Warren*

USNEI, Nyl.

Usnea hirta, Hoffm. (Only sterile.)

CETRARIEI, Nyl.

Cetraria Islandica, Ach. *Wootton Common*

— *aculeata*, Fr. *North Wootton*

Platysma ulophyllum, Nyl. *Between Yarmouth and Caistor*

— *pinastri*, Nyl. *Framingham*

— *glaucum*, Nyl. *Sall and near Sprowston*

PARMELIEI, Nyl.

Evernia prunastri, Ach. *Thetford*. (Only sterile)

Parmelia Borreri, Turn. *Norwich and Coltishall*

— *scorteae*, Ach. *Lakenham*

— *sulcata*, Tayl. *Holt*

— *acetabulum*, Dub. *Saham Wood*

— *exasperata*, Nyl. *Holt*

— *Mougeotii*, Schær. *Thetford Warren*

PELTIGEREI, Nyl.

Peltigera canina, Hoffm. (Frequent, often sterile.)

— *spuria*, Leight. *Near Norwich*

PHYSICIEI, Nyl.

Physcia parietina, D. N. *Holt and elsewhere*

var. *aureola*, Nyl. *Near Kings Lynn*

— *polycarpa*, Nyl. *Near Yarmouth*

— *ciliaris*, D. C. *Holt and Norwich*

— *pulverulenta*, Nyl. *Holt*

var. *subvenusta*, Nyl. *Norwich*

sub-sp. *pityrea*, Nyl. *Strumpshaw and Saham Wood*

— *stellaris*, Nyl.; sub. sp. *tenella*, Nyl. *Holt and Earsbam*

— *airpolia*, Nyl.; var. *cercidia*, Nyl. *Yarmouth*

— *caesia*, Nyl. *Acle*

— *ulothrix*, Nyl. *Lakenham and near Yarmouth*

— *obscura*, Nyl. *Seething and Yarmouth*

— *adglutinata*, Nyl. *Norwich*

LECANO-LECIDEI, Nyl.

Sub-tribe *PANNARIEI*, Nyl.

Pannaria nebulosa, Nyl. *North Wootton*

Pannularia nigra, Nyl. *Thetford*

Sub-tribe *LECANOREI*, Nyl.

Lecanora (Psoroma) hypnorum, Ach. *Near Yarmouth*

— (*Squamaria*) *saxicola*, Ach. *Thetford Warren and Yarmouth*

— (*Placodium*) *teicholyta*, Ach. *Strumpshaw*

— (*Candelaria*) *vitellina*, Ach. *Near Cromer and Yarmouth*

— *citrina*, Ach. *Norwich*

— *atroflava*, Nyl. *Thetford Warren*

LECANO-LECIDEI, Nyl. (continued)—

Lecanora cerina, Ach. *Coltishall*

— *pyracea*, Nyl., var. *pyrithroma*, Nyl. *Thetford Warren*

— *exigua*, Nyl. *Yarmouth*

— *roboris*, Nyl. *Yarmouth*

— *Conradi*, Nyl. *Thetford Warren*

— *umbrinofusca*, Nyl. *Thetford Warren*

— *subfusca*, var. *campestris*, Nyl. *Near Yarmouth*

— *albella*, Ach. *Holt and North Wootton*

— *varia*, Ach. *Near Yarmouth*

— *conizæa*, Nyl. (E. B., t. 1136). *Hevingham*

— *atra*, Ach. *Near Yarmouth*

— *parella*, Ach. *North Wootton*

— *tartarea*, Ach., var. *frigida*, Ach. *Near Norwich*

— *gibbosa*, Nyl. *Thetford Warren*

Sub-tribe, *PERTUSARIEI*, Nyl.

Pertusaria globulifera, Nyl. *Yarmouth*

— *coccodes*, Nyl. *Near Norwich*

— *Wulfenii*, D. C. *Hevingham and Acle*

— *velata*, Nyl. *Scole Inn and Cawston*

— *dealbata*, Nyl. *Norwich*

— *lutescens*, Lamy. *Hevingham*

— *leioplaca*, Schær. *Near Thetford*

Sub-tribe, *THELOTREMEI*, Nyl.

Phlyctis agelæa, Koerb. *Near Yarmouth*

Thelotrema lepadinum, Ach. *Costessey*

Urceolaria scruposa, sub-sp. *bryophila*, Nyl. *Thetford Warren*

Sub-tribe, *LECIDEI*, Nyl.

Lecidea (Gyalecta) geoica, Nyl. *Cromer*

— (*Gyalecta*) *pineti*, Ach. *Costessey*

— *coarctata*, Nyl. *About Yarmouth*

— *flexuosa*, Nyl.; f. *æruginea*, Leight. *North Wootton*

— *uliginosa*, Ach. *North Wootton Common and near Yarmouth*

— *Ehrhartiana*, Ach. *Acle and near Yarmouth*

— *decolorans*, Flk. *North Wootton*

— *cyrtella*, Ach. *Yarmouth*

— *Griffithii*, Hook. *Runton and Cromer*

— *sabuletorum*, Nyl. *Norwich*

— *syncomista*, Flk. *Thetford Warren*

— *rubella*, Schær.; et var. *porriginosa*, Cromb. *Near Yarmouth*

— *arceutina*, Ach., f. *effusa*, Sm. *Yarmouth*

— *muscorum*, Nyl. *Thetford Warren*

— *aromatica*, Ach. *Near Yarmouth*

— *cœruleo-nigricans*, Schær. *Thetford Warren*

— *parasema*, Ach. var. *elæochroma*, Ach. *Coltishall*

— *dubia*, Borr. *Hevingham*

— *enteroleuca*, Ach. *Thetford*

— *canescens*, Ach. *Yarmouth and Eaton*

— *epigæa*, Schær. *Thetford Warren*

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LECANO-LECIDEI, Nyl. (continued)—

- Lecidea alboatra*, Nyl. *Seething*
- var. *epipolia*, Ach. *Market Dere-*
ham and near *Yarmouth*
- *expansa*, Nyl. *Thetford*
- *Turneri*, Leight. *Trigby Church*
- *myriocarpa*, DC. *Thetford Warren*
and near *Kings Lynn*

GRAPHIDEI, Nyl.

- Graphis scripta*, Ach. *Coltishall*
- Opegrapha notha*, Ach. *Yarmouth*
- *pulicaris*, Nyl. *Lakenham*
- *varia*, f. *tigrina*, Leight. *Hadiscoe*
- *atra*, Pers. *Holt*
- *Leightonii*, Cromb. Near *Yarmouth*

GRAPHIDEI, Nyl. (continued)—

- Opegrapha lyncea*, Borr. *Holt*
- Arthonia epipasta*, Leight. *Thorpe*
- *cinnabarina*, var. *kermesina*, Schær.
- Near *Earsham* and *Holt*
- Stigmatidium crassum*, Dub. *Holt*

PYRENOCARPEI, Nyl.

- Endocarpon hepaticum*, Ach. Near *Nor-*
wich
- Verrucaria Garovaglii*, Mut. *Thetford*
- *muralis*, Ach. Near *Yarmouth*
- *viridula*, Ach. *Yarmouth*
- *epigæa*, Ach. Near *Norwich*
- *nigrescens*, Pers. *Thetford*

FUNGI

When one remembers that Norfolk is the fifth county in England in point of size, one naturally expects its fungus flora to be pretty extensive. And such is the case, with our heaths and bogs, our woods and pastures, our chalk downs and sandy wastes, our sea coast and our broadland, Norfolk has a pretty varied mycological flora. The fact that saprophytic fungi are very much confined to their own special food-stuffs is gradually coming to be more and more recognized—woodland and pasture-land, heath and roadside have their own particular denizens. Further than this even, the wood of deciduous trees and that of fir trees has each its own special fungus flora. This is a point Fries constantly reiterates in the *Monographia*. But we may go further still and say that many of the larger Hymenomycetes occur only on the detritus of certain plants and trees or that they are associated with them while they are alive ; for instance, *Amanita muscaria* occurs only under birch trees ; *Collybia radicata*, *Russula fellea* and *emetica* are found under beech ; *Lactarius deliciosus* near Scotch firs ; *Naucoria escharoides* in the humus of alders ; *Collybia vertirugis* on the dead stems of the previous year's braken plants. Whether these species are saprophytes pure and simple or whether any symbiotic connection exists between these fungi and the tree-roots is a point which merits working out. We all know that certain species are found only on certain dead tree-trunks or branches such as *Pholiota heteroclita* on poplar ; *Armillaria mucida* on beech ; *Leptonia euchroa* on alder ; *Polyporus ulmarius* on elm ; *P. fraxineus* on ash ; *P. dryadeus* on oak, etc. ; but here the element of parasitism comes in, although the boundary line between parasitism and saprophitism is not nearly so pronounced as it formerly was.

There are many biological problems connected with the Hymenomycetes which still require working out, but hiatus after hiatus has been filled up in this respect during the last decade, so that many species which used to be passed by as common and uninteresting are now objects of considerable interest ; for example, *Armillaria mellea* and *Polyporus annosus* (*Trametes radiceperda*, Hartig) on living timber, of which our county affords only too many examples.

BOTANY

Many rare and interesting Hymenomycetes have been recorded in Norfolk where the deciduous woods of the eastern and central portions of the county, and the fir woods of the western and southern, have each their own special fungal flora. Of the fir woods the fungi are very characteristic: *Amanita rubescens*, *Lactarius rufus*, *Collybia maculata*, *Cantharellus aurantiacus*, *Hydnum auriscalpium*, etc., are ever present and abundant. The county is distinctly poor in *Cortinarii*, only some thirty species being represented out of the total of nearly two hundred recorded in Massee's *Fungus Flora*. On the other hand Norfolk is famed for its Geasters having nine or ten out of the thirteen recorded for Britain. The grand *G. coliformis*, which was originally found between 'Gillingham and Earsham' in the last century, reappeared on a hedge-bank at Hillington in 1880, and has been gathered two or three times since in the same green lane. *G. fimbriatus* occurs with us commonly under spruce firs although not confined to this situation. *G. bryantii* is to be found both on hedge-banks and on the marshes near the sea in west Norfolk. *Batarrea phalloides* has not been seen here in recent years, but it occurred twice near Norwich in Sowerby's time, and 'W. J. Hooker' met with it near 'Stoke, Norfolk' prior to 1836. It is so remarkable a species that mycologists should keep the possibility of its reappearance in mind. *Xerotus degener* is another extremely rare fungus which Sowerby figured from specimens sent to him from Holt in November, 1798, by the Rev. Mr. Francis who 'finds them on heathy ground where turf stacks have stood.' It has never been seen in the county since, and merits careful search, especially as the wording of Sowerby's note implies that Mr. Francis had found it on more than one occasion.

The county is poor too in Hydna, only eleven out of forty-nine species having been recorded. One of these the magnificent *Hydnum coralloides* was also recorded by Sowerby. *H. imbricatum* requires confirmation as does *Clatharus concellatus* reported from near Lynn. *Torrubia capitata*, also a species of Sowerby's recording, was refound by Rev. Canon Du Port, some years ago near Mattishall.

The curious manner in which some fungi occur one season and then disappear permanently from that spot, has been well illustrated by such species as *Verpa digitaliformis* which appeared in a hedge-bank on North Wootton marshes in May, 1871, and never reappeared; also by *V. rufipes* which came up at Terrington St. Clements in May, 1875, and never since has grown there, although the exact place was annually visited year after year. *Volvaria bombycina* too was once gathered on the trunk of a living ash in Lovell's Hall Park in the same village, but never recurred. Some fungi appear once in abundance and then year by year diminish in numbers till they disappear entirely. *Peziza corium* did this on North Wootton Heath, where on a tramway it was abundant in April, 1876, but gradually got less and less numerous, and in the course of three or four years totally disappeared. It had never occurred in that spot prior to 1871, nor is there any other British record of it. *Boletus sulphureus* on the sawdust heaps at Brandon wood-yard affords a similar

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instance. It was dying out there in 1876, and the last specimen was gathered in November of that year. It is noteworthy that it also died out about the same time from its original habitat at Rothiemurchus in Invernesshire. This species, however, was refound in Norfolk by Mr. C. T. M. Plowright, on sawdust, in West Briggs Wood, Wormegay, on October 29th, 1899, on which occasion *Nidularia confluens* was added to the county flora.

The peculiar predilection certain species have for certain food-stuffs does not, however, preclude some curious anomalies in their place of growth : for instance, *Agaricus campestris* was found on a wall in Broad Street, Lynn, a few years ago, the mycelium having extended through the wall from a heap of stable manure on the other side ; *Tulostoma mammosum*, a very infrequent fungus with us, used to grow on some old walls in Norwich, from which however it has long disappeared, was found on a wall at Heacham in 1896, but most extraordinary to relate, it came up between the granite setts in the pavement in King Street, Lynn, a couple of years previously. *Morchella esculenta* we always associated with woods, but some years ago a single specimen came up in a small garden of not more than sixty square yards area in the middle of the town of Kings Lynn. Perhaps, however, the most remarkable illustration is afforded by *Psilocybe bullacea*, which for two or three years grew in the cranial cavity of a whale's skull at the West Norfolk Farmers Manure Company's Works at Lynn. On the other hand certain species can be gathered year after year, sometimes few in numbers sometimes many, but always within a few feet of the same spot. *Volvaria taylori* was first found on the sea bank, North Lynn, in July, 1871, and has regularly reappeared up to the present season (1900) when specimens were brought me from the same spot. *Clitocybe incilis* may be found year by year on the Castle Rising road, within twenty yards of the spot in which the first specimen was gathered in 1880. *Polyporus intybaceus* has for the last twenty years grown inside the same hollow oak in South Wootton, but although it is always the same tree yet certain seasons the fungus fails to put in an appearance.

What has been said about the peculiar affinity of the larger saprophytic fungi for certain food-stuffs applies equally to the smaller kinds : for example, wherever a heap of spent hops is deposited sooner or later *Peziza omphaloides* will appear on it ; old ivy sticks will develop *Nectria sinopica* ; old nettle stems *Peziza fusarioides*. Other instances are afforded by *P. firma* on dead oak ; *P. echinophila* on dead chestnut husks ; *Phycomyces nitens* on waste oil ; *Nectria inaurata* on holly sticks.

With regard to parasitic fungi the tendency among biologists at present is, if anything, to carry this too far and to make difference in host-plant an index of the specific value of the fungus with the Uredineæ and Ustilagineæ ; this however leads us beyond our present purpose.

Norfolk is rich in Uredineæ ; this is shown by the fact that we have no less than twenty-two out of the twenty-eight species of the British heterœcious Pucciniæ. It is interesting to remember that the heterœcious

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character of the wheat-mildew fungus (*Puccinia graminis*) was noticed in Norfolk by Marshall in the year 1781, not so much as regards the fungus, perhaps, as with respect to the disease. In the following year¹ Marshall put the matter to experimental test by planting a barberry bush in the middle of a corn-field and demonstrated to his own and his friends' satisfaction that the mildew was produced thereby.

Of the fungi causing plant diseases we have had many imported; the dreaded larch disease (*Peziza Wilkommii*) for instance is rife in some of our young plantations where the trees have been imported from Scotland. The uredo on the cultivated chrysanthemum was introduced into the county in 1898, and still flourishes. *Cronartium ribicolum*, Dietr., thrives in gardens where the imported Weymouth pines have their branches distorted by the *Peridermium*.

In conclusion, one remark on our sea-shore fungi. There are certain fungi which do not seem to be in the least injured by salt water: *Poronia punctata* I have only found in the county on horse-dung which has been washed up at 'high-water mark.' *Ascobolus violaceus* grows in profusion on cow-dung below high-water mark, while certain *Uredinæ* habitually occur on plants washed by the sea, e.g. *Puccinia asteris* on *Aster tripolium* and *Uromyces limonii* on *Statice limonium*.

Detailed lists of Norfolk fungi will be found in the *Transactions of the Norfolk and Norwich Naturalists' Society*, vol. i. October 29th, 1872; vol. iii. March, 1884, p. 730; vol. iv. March, 1889, p. 728.

¹ Marshall, *Rural Economy of Norfolk*, 2nd ed. vol. ii. p. 19 (London, 1795).

ZOOLOGY

MARINE ZOOLOGY

THE marine fauna of Norfolk, as of East Anglia in general, presents several distinctive features of interest, in comparison with the fauna of other parts of the British coasts. The shore and sea bottom have an unusually uniform character, while the sea in this region is subject to an exceptional annual range of temperature. These two factors exert a marked influence in determining the character of the local fauna, both by limiting the number of common North Sea species fitted to live under these conditions, and by favouring the development of certain species to an unusual degree.

The basin of the North Sea is geologically a great bight of the Norwegian Sea, and the great mass of its waters is still derived by tidal and drift currents from the northward, mixed with the cold waters which escape from the Baltic in spring after the melting of the winter ice and snow, and to some extent with the warm waters of the English Channel.

The general North Sea fauna is, however, modified on the Norfolk coast by the shallowness of the bottom in the adjacent region of the North Sea. The North Sea is in fact cut obliquely into two portions by the Dogger Bank and its extensions towards the Yorkshire coast in the west and towards the Danish promontory in the north-east. This line, which may be called the Dogger ridge, separates a northern deep region (from 30 to 100 fathoms deep) from a southern shallow region, everywhere less than 30 fathoms in depth. The trough of the deeper region is filled in summer with cold water, the temperature of which, in the height of summer, may be 12° or 13° F. less than that of the surface water in the same region, and even 15° or 16° F. below that of the water south of the Dogger. The presence of this underlying mass of cold water serves to moderate the temperature of the surface and coastal waters north of the Dogger, while the absence of such a layer south of the Dogger subjects the sea in this region to greater seasonal alternations of warmth and cold. The shallow shelving shores of East Anglia intensify this effect by exposing the coastal waters to the full influence of winter frosts and summer heat.

Thus it results that the water along the coast of East Anglia is colder in midwinter and hotter in midsummer than along any equal stretch of coast in the British Isles. This feature must be a most important factor in the physical conditions which determine the peculiar-

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ities of the marine zoology of Norfolk waters ; and although a detailed analysis of the Norfolk marine fauna from this point of view would be premature in the present state of knowledge, it is nevertheless probable that, as suggested by Metzger for the southern North Sea fauna in general, the paucity of the shore fauna is largely attributable to the excessive seasonal alterations of temperature, which render the summers too hot for purely northern species and the winters too cold for the permanent residence of purely southern types. Indirectly this view receives corroboration from the exceptional numbers of migratory species which frequent East Anglian waters in the summer and autumn months, but retire either to north or south with the approach of winter. Thus the herring, an essentially northern fish, does not arrive until the excessive summer heat has begun to wane in September, and retires to deeper water towards the end of November, when a rapid fall of temperature usually takes place off Norfolk and Suffolk. On the other hand, the mackerel, an essentially southern¹ fish, invades Norfolk waters from the English Channel in May, when the local temperature has begun to exceed the winter temperature at the mouth of the English Channel ; and the same fish finally retires in October or November, when the temperature has begun to fall markedly below the temperature then prevalent in the Channel.

The following record of average monthly temperatures off the north and east coasts of Norfolk will enable the student, by careful use of the thermometer, to tell whether in any particular year the sea is warmer or colder than usual, and thus perhaps to trace the causes of any exceptional phenomena which may occur in the migrations or abundance of particular members of the Norfolk fauna. The figures are derived from Mr. H. N. Dickson's valuable paper in the *Quart. Journ. Roy. Met. Soc.* (vol. xxv., October, 1899), and are computed from the regular observations for eighteen years of men employed on the lightships mentioned. The temperatures taken further inshore on the Newarp light-vessel are practically identical with those recorded from the Leman and Ower light-vessel. The scale is that of Fahrenheit :—

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Outer Dowsing L. V.	41·6	40·8	41·0	43·2	46·3	52·5	55·6	57·2	56·7	53·2	48·8	45·1
Leman and Ower L. V.	40·9	39·9	40·5	43·1	47·6	53·1	57·3	59·1	57·9	53·7	48·9	44·3

Another factor, equally important in determining the character of the Norfolk fauna, is the nature of the ground and coast-line. The exposed coast, and the lack of sheltered creeks and inlets, render the fauna of Norfolk less rich than that of Essex, although the latter region is subject to temperature changes closely resembling those of Norfolk. The scarcity of rocks also deprives the region of great numbers of fixed and climbing forms which would otherwise be present.

The fauna thus consists principally of those sand- or mud-loving types which are capable of withstanding an exceptionally wide range of

¹ Other examples of southern immigrants in summer are the red mullet, anchovy, and latchet (*Trigla hirundo*), which are sometimes caught in large numbers.

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temperature, together with a considerable number of periodic migrants, which are attracted from the south in early summer, and probably from the north and east in autumn, owing to the peculiarities of temperature which characterize East Anglian waters in those seasons. Purely northern or purely southern types are exceptionally scarce in the resident Norfolk fauna.

Out of a total of thirty-one recorded hydroid zoophytes two only can be said to have a restricted distribution, viz. the southern *Coryne vaginata* and the northern *Sertularia filicula*.

Out of twenty-six recorded Polyzoa two only are northern types, viz. *Menipea ternata* and *Cribrilina annulata*, and five are more or less southern types, viz. *Scrupocellaria scrupea*, *Bugula plumosa*, *Membranipora lacroixii* and *monostachys*, and *Amathia lendigera*. It appears to be particularly significant that *Bugula purpurotincta*, a close relative of *B. plumosa*, but a purely northern type, has not been obtained south of Flamborough Head, though abundant along the coast from Scarborough to Wick. The creeks and waters of East Anglia appear to be the headquarters of *Membranipora monostachys*, which nowhere attains such luxuriance of growth and numbers as here.

Out of twenty recorded chætopod worms all are common wide-ranging forms, except *Eulalia sanguinea* and possibly *Sabellaria spinulosa*, which are distributed principally to the northward.

In the following records I have relied principally upon the reports¹ of the surveying cruise of the German ship *Pommerania* in the summer of 1872 (*Fabresbericht d. Commission z. wiss. Untersuchung d. deutschen Meere in Kiel*, ii. and iii. 1875). The valuable information in these reports has been supplemented from notes or specimens communicated to me by various Norfolk naturalists, among whom I desire to thank especially Dr. S. F. Harmer of Cambridge; Mr. H. D. Geldart, Mr. Thomas Southwell, and Mr. R. A. Todd of Norwich; and Mr. A. Patterson of Yarmouth, for their kind and willing assistance.

CŒLEENTERATA (*Jellyfish, Sea Anemones, etc.*)

Stinging animals, of circular outline, having all their organs radially arranged round a central mouth; free-swimming (*e.g.* medusæ) or sedentary (*e.g.* hydroid zoophytes, sea anemones); solitary (*e.g.* medusæ and anemones) or subdivided into 'colonies' by budding (*e.g.* hydroid zoophytes). The units in the colonies are known as polyps.

I. HYDROZOA

1. HYDROID ZOOPHYTES

Colonial, forming arborescent or encrusting stocks, attached to stones, shells, worm-tubes and seaweeds.

Nomenclature: Hincks, *British Hydroid Zoophytes*, 1868 (= H).

1. *Cordylophora lacustris*, Allman.

In brackish or fresh waters. Near Kings Lynn (Dr. Low).

2. *Hydractinia echinata* (Fleming).

Incrusting the shells of univalves (esp. *Buccinum* and *Natica*) tenanted by hermit crabs. Off Yarmouth (P.).

3. *Coryne vaginata*, Hincks.

Cromer (H. D. Geldart); Hasborough (R. A. Todd).

4. *Hydranthea margarica*, Hincks.

Off Yarmouth, growing on *Flustra foliacea* (Dr. S. F. Harmer, 1899).

¹ For the sake of brevity the *Pommerania* records are indicated in the sequel by the letter P.

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5. *Bimeria vestita*, T. S. Wright.

Generally on other zoophytes and seaweeds. Off Yarmouth (P.).

6. *Tubularia indivisa*, Linn.

Common in deep water; often found on the supports of piers and sides of pontoons in sheltered harbours. Off Cromer and Yarmouth, 13-16 fathoms, abundant (P.).

7. *Tubularia larynx*, Ell. and Sol.

Distributed like the preceding species, but more common in shallow water. Off Cromer, abundant (P.).

8. *Clytia Johnstoni* (Alder).

Abundant on the stems of *Tubularia indivisa* and *Zoophytes*. Off Cromer and Yarmouth (P.).

9. *Obelia gelatinosa* (Pallas).

On drift *Fucus* in Yarmouth harbour (P.).

10. *Obelia dichotoma* (Linn.).

Not actually recorded for Norfolk waters, but taken by the *Pommerania*, S.E. of Lowestoft. It is usually attached to other zoophytes (*Hydrallmania*, *Sertularia argentea*).

11. *Campanularia verticillata* (Linn.).

Abundant on the trawling grounds. Off Cromer (P.).

12. *Campanularia flexuosa* (Hincks).

Common at various depths. Off Cromer and Yarmouth, 12-15 fathoms (P.).

13. *Campanularia exigua* (Sars).

A small species, probably this, was found commonly on *Sabellaria* tubes by Dr. Harmer at Yarmouth, in July, 1899.

14. *Calycella syringa* (Linn.).

Growing on other zoophytes. Off Cromer and Yarmouth (P.).

15. *Filellum serpens* (Hassall).

Growing on *Sertularia abietina*, *Hydrallmania falcata*, and other zoophytes. Off Yarmouth (P.).

16. *Halécium halecinum* (Linn.).

Abundant in deep water, especially on gravelly grounds. Off Cromer, Hasborough and Yarmouth (P.). On *Sabellaria* tubes, Yarmouth (Harmer).

17. *Halécium beanii*, Johnst.

Common on *Sabellaria* tubes, Yarmouth (Harmer).

18. *Sertularella polyzonias* (Linn.).

Off Cromer, Hasborough and Yarmouth, 10-15 fathoms (P.).

19. *Sertularella gayi* (Lamouroux).

In deep water off the coast (C. W. Peach). With the preceding species it is especially abundant on fine sandy bottoms.

20. *Diphasia attenuata* (Hincks).

Generally on other zoophytes. Off Yarmouth (P.).

21. *Sertularia gracilis*, Hassall.

Recorded by Peach for the Norfolk coast as a 'delicate variety of *S. pumila*.' There is no record of *S. pumila* for Norfolk waters, although this species is probably the commonest on our shores. *Sertularia pumila* is usually abundant on *Fucus* between tide-marks, whereas *gracilis* is not restricted to tidal water and is often found on the zoophyte *Hydrallmania falcata* as well as on algæ (H.).

22. *Sertularia filicula*, Ell. and Sol.

This species 'is of delicate, wavy habit and a somewhat bright straw-colour, and is one of the prettiest of its tribe. It is generally luxuriant in growth and presents a complex ramification. It is cast on shore in large, tangled masses, and may be known at once by its zigzag stems, its peculiar colour, and its exquisite delicacy. The flask-shaped calyces, too, with the bent apertures, one of which stands in each axil, afford a good distinctive mark' (Hincks). Off Norfolk (C. W. Peach).

23. *Sertularia abietina*, Linn.

Off Cromer, Hasborough and Yarmouth, common (P.).

24. *Sertularia argentea*, Ell. and Sol.

Off Cromer and Yarmouth, common (P.).

25. *Sertularia cupressina*, Linn.

Off Norfolk (C. W. Peach).

26. *Hydrallmania falcata* (Linn.).

Pithily described by Sir J. Dalyell as 'a series of feathers implanted in spiral arrangement around a slender stem.' One of the commonest zoophytes of our eastern waters. Off Cromer, Hasborough and Yarmouth (P.).

27. *Thuiaria articulata* (Pallas).

Off Norfolk (C. W. Peach).

28. *Antennularia antennina* (Linn.).

Common on sandy bottoms. Off Cromer, Hasborough and Yarmouth, abundant (P.).

29. *Antennularia ramosa*, Lamarck.

Off Hasborough and Yarmouth, less common than the preceding (P.).

30. *Plumularia setacea* (Ellis).

Off Cromer and Yarmouth (P.).

31. *Plumularia echinulata*, Lamarck.

Taken at Runton in 1875 by Mr. Geldart.

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2. MEDUSÆ

Gelatinous, bell or disc-shaped, transparent, often with radiating or marginal streaks of brilliant colours; not colonial; free-swimming, often in large shoals.

The smaller medusæ are produced by lateral budding from various Hydroid stocks, especially such forms as *Podocoryne*, *Syncoryne*, *Perigonimus*, *Bougainvillea*, *Corymorpha*, *Clytia*, *Obelia*, and *Campanularia*. Whenever these Hydroids occur their medusæ may be obtained either from the Hydroids themselves at the proper season, or with a muslin net at the surface of the sea. Other medusæ may also be found whose larval or Hydroid phases are not yet determined.

The larger medusæ, which are so frequently cast ashore after strong sea-breezes in the summer months, do not always exhibit a similar alternation of stages in their life-history; but *Aurelia* and *Chrysaora* are known to be produced by a remarkable process of successive fission from minute hydra-like polyps which form extensive colonies on old oyster-shells and similar objects.

My present list of local medusæ is very brief from the scantiness of existing records.

A. Hydromedusæ

I. *Obelia*, sp.

The medusa of *Obelia* is readily recognized by its perfectly flat and disc-shaped umbrella, its short quadrate manubrium, its numerous short marginal tentacles (24 to 114, according to age), and its eight marginal otocysts, as well as by its brilliant phosphorescence. It varies in diameter from 1 to 6 mm. according to age.

Under the name *Eucope lucifera*, Schultze records a number of small medusæ derived from *Obelia* colonies which were taken in a surface net off Cromer during the *Pommerania* cruise. Haeckel has attempted to refer the various described types of *Obelia* medusæ to their respective Hydroid stocks, basing his distinctions on the length of the tentacles and manubrium relatively to the umbrella radius, and on the position of the ovaries on the radial canals, *i.e.* whether in the proximal, middle or distal thirds of the course of the canals. As some of these differences are known to be due to growth-changes, it is doubtful how far they can be relied upon as specific characters. The only safe plan of identification will be to rear the medusæ of various *Obelia* colonies to maturity in aquaria, until the characters of several species are known at successive ages.

B. Discomedusæ

2. *Aurelia aurita* (Linn.).

Umbrella very slightly arched; margin beset with numerous very short tentacles and notched at eight equidistant points; transparent, the ovaries showing through as four horse-shaped masses of a violet or purplish colour. Common close around our coasts. The *Pommerania* met with this and the next species in all parts of the North Sea, but the individuals found far from shore were scattered and of small size.

3. *Cyanea capillata* (Linn.).

Umbrella slightly arched, disc-shaped; margin divided as in *Aurelia*, but beset with long slender tentacles. Colour usually yellowish brown or reddish yellow. Common all round the North Sea. The beautiful blue *Cyanea Lamarckii* is far rarer than the preceding species, and has not yet been recorded for Norfolk.

C. Lucernarians

Sheringham has been reported as a good locality for *Lucernarians*, but I have no record of the species found there. A minute long-stalked *Lucernarian* obtained on the Norfolk coast by Mr. Geldart appears to be a young specimen of *Depastrum cyathiforme*, but the record needs confirmation.

II. CTENOPHORA

Jellyfishes devoid of a muscular umbrella and provided with eight vertical (meridional) rows of iridescent paddles.

1. *Pleurobrachia pileus*, Modeer.

Shape ovoid; size usually $\frac{1}{2}$ to $\frac{3}{4}$ inch. Provided with a pair of flexible fringed retractile tentacles. Off Cromer and in Yarmouth harbour, common (P.).

2. *Beræ*, probably *ovata*, Eschscholtz.

Shape cylindrical; size usually from 1 to 3 inches. No tentacles. Off Cromer, rare (P.).

III. ANTHOZOA

Sea Anemones and Corals

Nomenclature: Gosse, *British Sea Anemones and Corals*, 1860.

1. *Alcyonium digitatum*.

Commonly known as 'dead men's fingers,' 'cow's pap,' etc. Abundant in the deeper waters, but not recorded nearer than twenty miles north-west of Cromer (P.), though doubtless often cast ashore.

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2. *Sagartia bellis* (Ell. & Soll.) the 'daisy.'

Body-wall smooth, studded with suckers in its upper portion, and pierced with loopholes for the ejection of stinging-threads. Disc broad and slightly wavy at the margin; tentacles numerous. Colour of disc dark brown or black, with radiating lines of a different colour, generally red; the disc and tentacles together generally present a stellate pattern, caused by the regular alternation of groups of tentacles of two contrasted colours. Off Hasbrough, on *Sabellaria* ground (P.).

This and the next species are the only *Sagartians* recorded for Norfolk waters, but *S. viduata* almost certainly occurs. This species is distinguished by the greatly elongated column, marked with vertical brown stripes, and the slender, very flexible tentacles marked on each side with a long dark brown line. It adheres to rocks and loose stones between tide-marks and in shallow water.

3. *Chitonactis coronata* (Gosse).

This species was wrongly referred by Gosse to the genus *Bunodes*, owing to the tuberculation of the body-wall. Unlike *Bunodes*, however, this species possesses sting-threads. The warts are almost confined to the upper region of the column, in twelve vertical lines as well as irregularly scattered. A distinct groove and 'parapet' separate the disc from the column; the tentacles are very short (shorter than the radius of the disc); and the body-wall secretes a deciduous epidermis. It is widely distributed over the North Sea in the deeper water, and was dredged by the *Pommerania* off Hasbrough, on *Sabellaria* ground.

4. *Tealia crassicornis* (O. F. Müller).

Column squat, with an expanded base, irregularly studded with rigid tubercles which act as suckers; tentacles short, inflated, conical, general banded or broadly blotched. Colours dull crimson, or dull green with crimson markings. In tide-pools, crevices of rock or masses of *Sabellaria* tubes. Off Hasbrough (P.).

IV. CHÆTOPODA

Segmented worms, provided with lateral tufts of bristles or hooks for locomotion.

A. NEREIDS

Elongated worms with tentacles and prominent foot-lobes; active, rapacious.

1. *Nereis diversicolor*, Müll.

The common harbour or 'rag-worm,' 3-4 inches long. Distinguished by two diverging brown bands immediately behind the head.

Burrows in mud or sand between tide-marks, even in brackish water.

2. *Nereis pelagica*, Linn.

Colour red-brown or bronze. The body is widest about the middle instead of near the front. Rocky or stony ground, common. Hasbrough (P.).

3. *Nephtys*, Sp.

Body flattened; a sickle-shaped gill under the upper lobe of each foot; colour yellowish white, with a pearly lustre. Size, 3-4 inches. Burrows in sand. Hasbrough (R. A. Todd).

4. *Syllis armillaris*, Örst.

Length 2 inches. Colour pale yellowish-brown, with a couple of dusky marks on each segment. Feet with rather long slender dorsal cirri, divided into 8 or 10 joints. Usually common at low-water. Hasbrough, rare (P.).

5. *Eulalia sanguinea*, Örst.

Dorsal cirri of the feet flattened into broadly ovate, pointed leaves; ventral cirri oval. Head with 5 tentacles and 2 eyes, followed by 4 pairs of tentacular cirri. Colour reddish; length $1\frac{1}{2}$ inches. Off Hasbrough (P.).

B. SCALE-BACKED WORMS

6. *Polynoe squamata*, Linn.

Scales in 12 pairs, entirely covering the body, conspicuously fringed. Size 1 inch. Common under stones. Hasbrough (P.), Cromer (Geldart), Yarmouth (Harmer).

7. *Aphrodite aculeata*, Linn.

The 'sea-mouse.' The scales are concealed beneath a felted roof of fine hairs arising from the feet, the free hairs on the sides being brilliantly iridescent. Length 3-6 inches, exceptionally broad and thick. Burrows in mud. Hasbrough: offshore (P.); on the beach (R. A. Todd).

8. *Sthenelais boa*, Johnston.

Body long, slender, up to 8 inches. Scales covering the back, very numerous (e.g. 100 pairs). Burrows in sand. Hasbrough (P.), Yarmouth (Harmer).

C. LUG-WORM TRIBE

Sluggish burrowing worms, without tentacles or prominent foot-lobes; cylindrical in shape, indistinctly segmented.

9. *Ophelia limacina* (Rathke).

Rather flat, slug-like; head with a pointed snout; gills on the middle segments only, filamentous, red. Colour pale; cuticle pris-

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matic. Length $1\frac{1}{2}$ –2 inches. In sand. Cromer (P.).

10. *Ammotrypane aulogaster*, Rathke.

Like the preceding, but more cylindrical; gills on all segments; sides of body ridged, ventral surface grooved. In sandy mud. Recorded from deep water. Silver Pit (P.).

11. *Arenicola marina*, Linn.

The common 'lug-worm.' Gills, 12 or 13 pairs, red, arborescent, forming tufts on the middle segments. Hasbrough (R. A. Todd).

12. *Praxilla prætermis*a, Malmgren.

Head with an oval membranous rim, incised at 3 points; segments 26, the last 5 without foot-bristles; anal segment with a circlet of 22–33 cirri, one being longer than the rest. No gills. Colour pale ochre. Length $4\frac{1}{2}$ inches. Off Hasbrough, in mud (tubes ?) (P.).

D. TUBE-BUILDING WORMS¹

I. *Terebellida*.

Head bearing a tuft of flexible filiform tentacles, and succeeded by 1–3 segments bearing short tufts of gills.

13. *Lanice conchilega*, Pall.

The common 'sand-mason'; length 3–6 inches. Gills arborescent. Tube made of agglutinated particles of shell, pebbles, etc.; it is buried in sand except a short terminal portion which protrudes and bears a characteristic fringe of sandy threads. Hasbrough (R. A. Todd), Yarmouth (Harmer).

14. *Thelepus cinnatus*, Fabr.

Length 2–4 inches, reddish, with a reticulate pattern on the back. Gills unbranched, in transverse rows, on 3 segments. Tube thin, adherent by its whole length to shells, etc. Off Yarmouth, common (P.).

II. *Auricomata*.

Tentacles numerous but short; head provided with large golden bristles; hinder part of body different from the front.

15. *Pectinaria auricoma*, Müll.

Head-bristles forming a pair of straight combs, set in a line; shortly behind these is a low membranous collar with a dentate margin.

¹ Some of the Nereids also secrete tubes, but do not *build* them with foreign particles.

Tube smooth, conical, slightly curved, open at both ends; made of sand-grains cemented together. Length $1\frac{3}{4}$ inches. Cromer (Geldart).

16. *Pectinaria belgica*, Pallas.

Differs from the preceding in having a smooth margin to the membranous collar, and builds a straight tube. Common in sand-flats, in which it burrows head-first (probably with its combs).

17. *Sabellaria akveolata* (Linn.).

Head-bristles forming a complete crown, and composed of three series on each side, those of the innermost series pointing inwards, the rest outwards. Outermost bristles palmate, and armed with 5–7 smooth curved prongs at their tips. Tubes made of coarse sand-grains; generally aggregated in large irregular masses near low-water mark. Reported abundant off Cromer, Hasbrough and Yarmouth (P.), but possibly confused with the next species.

18. *Sabellaria spinulosa* (Leuckart).

The outermost opercular bristles have the central prong greatly elongated and spinous. Below low-water mark. Abundant off Yarmouth (S. F. Harmer).

III. *Sabellida*.

Head surrounded by a collar and bearing a wreath of feathery gill-plumes, in two lateral halves.

19. *Sabella penicillus*, Linn.

Length 10 or 12 inches. Gill-plumes $1\frac{1}{2}$ inches long, spotted with purplish brown. Labial tentacles 2, conical. Tube straight, slender, made of fine mud, and deeply imbedded in the same material, at or below low-water mark. Yarmouth (Harmer).

20. *Serpula triquetra* (L.), Mörch.

One of the labial tentacles is modified into a calcareous operculum, furnished with a couple of horn-like processes. Tube thick, white, calcareous, keeled, adherent along its length to stones, shells, etc. Length $1\frac{1}{2}$ inches. Off Cromer and Hasbrough, fairly common (P.).

21. *Filograna implexa*, Berkeley.

Length $\frac{1}{4}$ – $\frac{3}{8}$ inch. Gill-plumes 8 on each side, one of which on each side is slightly expanded to serve as an operculum. Tubes white, calcareous, very slender, intertwining in masses 3 or 4 inches high. Off Hasbrough, common (P.), Yarmouth (Harmer).

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V. GEPHYREA

22. *Phascolosoma vulgare* (Blainville).

Body cylindrical; skin yellowish, smooth, tough, shining. Proboscis about half the length of the body, and invaginable into the latter; its anterior swollen part provided with a diffuse band of small brown hooklets, and with 16 circumoral tentacles. Length 5-6 inches. Burrows in sand.

VI. CHÆTOGNATHA

23. *Sagitta bipunctata*, Quoy and Gaimard.

Body cylindrical, elongated, transparent; provided with 2 pairs of lateral fins; tail fins small. Length $\frac{3}{4}$ inch. Lives freely floating in the sea. Mouth armed with lateral hooks.

VII. POLYZOA

Animals of minute size, provided with a circlet of ciliated tentacles, and forming extensive colonies, either reticulate, encrusting, or arborescent. The lower part of the body of each individual (or *zooid*) has usually a horny or calcareous skin, which forms a box or tube (called the *zoæcium*), into which the delicate upper portion can be quickly withdrawn for purposes of protection. In the Cheilostomes the 'mouth' of this box can be closed by a movable lid (the *operculum*) which in certain modified zoœcia of the colony is converted into a snapping beak (*avicularium*) or a long slender spine (*vibraculum*) for cleansing the colony.

Nomenclature: Hincks, *British Marine Polyzoa*, 1880.

I. CHEILOSTOMATA

1. *Euratea chelata* (Linn.).

Colony composed of a creeping base (usually lines of decumbent zoœcia) and of delicate branching shoots. Zoœcia in single rows, white, subcalcareous, expanding upwards; aperture oblique, margin unarmed; often bearing a short tubular appendage below the aperture. Yarmouth, on *Amathia* and *Vesicularia* (Harmer).

2. *Menipea ternata* (Ell. and Sol.).

Colony arborescent, forming delicate white tufts with curling branches on the larger Hydroids (*Hydrallmania*, *Sertularia*, etc.) to which it binds itself by numerous tendrils. Zoœcia tapering below, united in sets of three; 'aperture' subterminal, oval, protected by an overhanging fan-shaped spine, and 2 or 3 terminal spines. Large lateral avicularia. Off Hasborough (P.).

3. *Scrupocellaria scruposa* (Linn.).

Colony arborescent, forming stiff bushy tufts of a white colour. Zoœcia in double series. Aperture large, elliptical, with 2 slender spines only on each side above. Under stones and on weeds, zoophytes, etc. Off Hasborough (P.), Yarmouth (Harmer).

4. *Scrupocellaria scrupæa*, Busk.

Like the preceding, but the aperture oval, and protected by an overhanging opercular plate, as well as by 3 spines on the outer margin above, and 1, or occasionally 2, on the inner. Off Hasborough (P.).

5. *Scrupocellaria reptans* (Linn.).

Colony forming stiff ragged sprays. Marginal spines as in *S. scrupæa*, but the opercular

spine is branched and antler-like. Avicularia and vibracula present in all three species. Not yet recorded, but generally common between tide-marks.

6. *Bicellaria ciliata* (Linn.).

Colonies pearly white, in delicate feathery tufts. Zoœcia biserial, alternate; the elliptical aperture guarded by exceedingly long marginal spines, viz. 4-7 above, 1 centrally below, and 1 or 2 on the back. Yarmouth, common (Harmer).

7. *Bugula plumosa* (Pallas).

Colony in tall feathery tufts, with fan-like branches spirally arranged. Colour, when alive, bright buff. Zoœcia biserial. Aperture large, with a single spine at the top. Avicularia ('birds' heads) very small. Recorded off Hasborough and Lowestoft (P.), Yarmouth (Harmer).

8. *Flustra foliacea* (Linn.).

The 'sea-mat.' Colony erect, in large flat fronds of a brown colour, deeply divided. Aperture with 2 marginal spines on each side and often 1 at the top. Abundant off shore and thrown up in quantities on the beaches (P.).

9. *Membranipora lacroixii*, Audouin.

Colony forming a thin gauze-like crust over shells and stones. Zoœcia oval or elongated; aperture oval, occupying the whole of the front; margin thickened; spines usually 1 pair above, rarely numerous (11), and then very delicate and pointing inwards. Abundant on dead *Mytilus* shells and other objects, Yarmouth (Harmer).

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10. *Membranipora monostachys*, Busk.

Colony incrusting, branching and reticulated. Zoecia ovate, slightly narrowed below; aperture oval, occupying two-thirds of the front; margins thin, bearing a central spine below, and sometimes a pair near the top; or armed with numerous (18) delicate spines pointing inwards. Yarmouth, on mussel shells, etc., abundant (Harmer).

The variety *fossaria*, forming friable sponge-like masses on the stems of plants, occurs near Yarmouth in ditches of brackish water a mile from the sea (Wigham).

11. *Membranipora pilosa* (Linn.).

Colonies in large flat incrusting sheets on *Fucus* and other weeds, between tide-marks. Aperture oval, surrounded by numerous marginal spines (4-12), which bend inwards; a long horny spine usually present behind the area. Cromer (Harmer), Hasborough (P.), Yarmouth (Harmer).

12. *Cribrilina annulata* (Fabr.).

Colonies forming small circular reddish crusts on *Laminaria*, shells or stones. Zoecia ovate, convex; the sides wrinkled. About 6 pairs of perforated centripetal furrows. The raised calcareous bars between the furrows represent the marginal spines of *Membranipora* fused into a roof over the membranous aperture. Orifice suborbicular, with a thickened rim and 3 (or 4) terminal spines. Inside a mussel-shell off Yarmouth (P.).

13. *Schizoporella linearis* (Hassall).

Colony incrusting, rose-coloured. Zoecia entirely calcareous, rhomboidal, in regular rows, separated by raised lines; orifice round, with a pointed notch below, and 2-4 spines above. Avicularia minute, elevated, usually one on each side behind the orifice. On *Sabellaria* tubes, Yarmouth (Harmer).

14. *Mucronella peachii* (Johnst.).

Colonies incrusting, calcareous, large, flat, of irregular outline; on *Laminaria*, shells, stones, etc. Zoecia ovate, globose, notched around the margin (a relic of the gaps between ancestral roofing spines, cf. *Cribrilina*). Orifice subquadrangular, mucronate, with 6 spines or denticles. No avicularia. Off Cromer and Hasborough (P.).

15. *Lepralia pertusa* (Esper).

Colonies calcareous, circular, incrusting, orange-coloured, with a glistening lustre. Zoecia large, ovate, tumid, closely punctured; orifice circular. Avicularia rare; small, oval, placed on one side near the orifice. On shells, stones, etc. Off Hasborough (P.).

16. *Celleporella costazii*, Andouin.

Colonies minute, calcareous, incrusting; on stems of sertularian hydroids and algæ. Zoecia crowded, ovato-cylindrical; orifice terminal, with a prominent knob on each side bearing a minute avicularium. Off Hasborough (P.).

II. CTENOSTOMATA

17. *Alcyonidium gelatinosum*, Linn.

Colonies erect, gelatinous, smooth, lobed and branched, yellowish in colour. Height usually 3 to 18 inches. Off Yarmouth (P.).

18. *Alcyonidium mytili*, Dalyell.

Colonies incrusting, fleshy, dingy white, the surface finely papillated and showing the hexagonal boundaries of the zoecia. Common on shells, etc., Yarmouth (Harmer).

19. *Vesicularia spinosa* (Linn.).

Colonies arborescent, horny, very delicate; the main stems zigzagged, the branches dichotomously branched, bearing oval transparent zoecia at intervals. Height 4-12 inches. On stones, oyster-shells, etc. Off Yarmouth, common (Harmer).

20. *Amathia lendigera* (Linn.).

Colonies arborescent, in tangled masses on fibrous algæ and zoophytes. Zoecia cylindrical, disposed in small groups immediately below the forks of the branches, each group consisting of 4-8 pairs arranged in two contiguous parallel rows. Tentacles 8. Yarmouth (Harmer).

21. *Bowerbankia imbricata* (Adams), var. *densa*.

Colonies (in the variety) consisting of large cylindrical transparent zoecia, disposed in groups along a creeping stolon. Tentacles 10. On *Flustra*, Yarmouth (Harmer).

22. *Triticella flava*, Dalyell.

Zoecia laterally compressed, erect, ovate, attached to a creeping stolon by short stalks, on which they are movable. On backs of crabs (*Portunus holsatus*), Yarmouth (Harmer).

III. CYCLOSTOMATA

23. *Crisia aculeata*, Hassall.

Colonies in small white tufts, the branches curling inwards. Zoecia tubular, calcareous, in double series, many bearing a long spine near the top; the series are divided into segments by yellowish horny joints. Height $\frac{1}{4}$ -1 inch. Yarmouth, on *Flustra*, *Vesicularia* and Hydroids (Harmer).

24. *Diastopora patina* (Lamarck).

Colonies small ($\frac{1}{4}$ inch diameter), white, calcareous, discoid; surrounded by a broad,

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thin, calcareous border. 'Zoœcia tubular, in radiating lines, crowded, without any radiating intervals. Yarmouth, on *Sabellaria* tubes (Harmer).

ENTOPROCTA

25. *Pedicellina cernua* (Pallas).

Colonies consisting of clusters of whitish cup-shaped zooids, laterally compressed, surmounted by a crown of tentacles, and attached

by stout, tapering, spiny stalks to a creeping stolon. The zooids, when disturbed, sway themselves about with much vigour. Yarmouth, on *Vesicularia* (Harmer).

26. *Loxosoma phascosomatum*, Vogt.

Resembling the preceding, but the zooids are in groups of separate individuals, not connected by a stolon. Tentacular crown placed obliquely; stalk long, smooth, flexible. On tail end of *Phascosoma* (P.).

VIII. ECHINODERMA (*Star-fishes, Sea-urchins, etc.*)

Nomenclature: Bell, *British Museum Catalogue*, 1892.

1. *Asterias rubens*, Linn.

The common red cross-fish or 'five-fingers.' Cromer (Geldart).

2. *Solaster papposus* (Fabr.).

The red 'sun-star'; arms 12 to 15. Cromer (P.; Geldart).

3. *Ophiura albida*, Forbes.

The smaller 'sand-star.' Disc and arms smooth, scaly. Inter-radial plates (on the lower surface) shield-shaped, almost as broad as long. Common under stones at Runton (Geldart).

4. *Ophiopholis aculeata* (Linn.).

Upper surface of disc ornamented with small, irregular plates, separated by tracts of

minute blunt spines or granules. Upper plates of the arms ovate, surrounded by small accessory plates. Off Cromer, fairly common (P.).

5. *Ophiobrix fragilis* (O. F. Müller).

The common 'brittle-star.' Disc covered with spines in the intervals between the long triangular radial shields. Arms very flexible with long spines. Yarmouth (Harmer).

6. *Echinus miliaris*, Linn.

The shallow-water urchin. Shell more or less depressed above and distinctly pentangular. Runton (Geldart), Yarmouth (Harmer).

7. *Echinus esculentus*, Linn.

The edible urchin. Shell almost spherical. Off-shore only, except after gales when it may be cast ashore (Geldart).

IX. TUNICATA (*Sea-Squirts or Ascidians*)

1. *Ascidia virginea* (O. F. Müller).

Body irregularly quadrangular, compressed, the two siphons forming the upper angles. Test smooth, transparent, colourless, showing the brilliant crimson and white colouration of the skin beneath. Length about 2 inches. Adherent by the base to stones or shells. Off Yarmouth (P.).

2. *Ascidia aspersa* (O. F. Müller).

Body ovate, compressed, nearly twice as long as broad; apertures near together, terminal. Test semi-transparent, rough with conical papillæ, especially near the siphons. Length, 2-3 inches. Adherent by the base and part of the left side to stones, shells, and *Fucus*, in shallow water. Off Cromer (P.).

3. *Cynthia (Microcosmus) claudicans*, Sav.

Body erect, irregularly conical or ellipsoidal, the mouth terminal, the cloacal pore about the middle of the dorsal side; both apertures 4-lipped, on pyramidal siphons. Test leathery, opaque, brownish, wrinkled, beset with fine

prominences which agglutinate sand particles. Branchial folds 8 or 9 on each side. Off Cromer (P.).

4. *Cynthia (Polycarpa) comata*, Alder.

Body globular, lying free in sand, to which it binds itself by numerous long branched adhesive threads. Apertures 4-lipped, on quadrangular siphons, lying close together in a groove which closes over them during retraction. Branchial folds 4 on each side. Off Cromer (P.).

In external appearance and habits this species resembles *Molgula (Eugyra) glutinans*, Möll., which is recorded from the Silver Pit, and is distinguishable by the 6-lipped mouth and the absence of branchial folds.

5. *Molgula ampulloides*, Van Beneden.

Body barrel-shaped, 1 inch long; apertures terminal on short siphons, the mouth 6-lipped, the cloaca 4-lipped. Inhabits fine sand, to which the animal binds itself by fine adhesive threads. Branchial folds, 6 pairs. Off Cromer (P.).

MOLLUSCS

The number of species recorded for the county of Norfolk amounts to 100, and this out of a total of 139, known to occur in the British Islands, may be considered a very high county average.

It is an essentially British assemblage, offering no example of forms typical of the south-western or northern districts.

So far as the distribution of its snails is concerned the county is roughly divisible into the low-lying marshy tracts of the river valleys, and the uplands.

The ditches in the former yield an abundance of species, but the broads are tenanted by only a few kinds.

In the uplands the hedgerow forms predominate ; but isolated ponds, even those which are nearly dry in summer, yield unexpectedly large numbers of specimens.

An introduced species, *Stenogyra goodalli* (Mill), whose home is in the West Indies, has been found in hothouses at Carrow.

A. GASTROPODA

I. PULMONATA

a. STYLOMMATOPHORA

- Testacella haliotidea*, Drap. Aylsham ; Diddington Hall, Brandon ; Norwich (?)
- *scutulum*, Sby. Norwich, Foulsham, Lynn
- Limax maximus*, Linn.
- *flavus*, Linn.
- *arborum*, Bouch.-Chant.
- Agriolimax agrestis* (Linn.)
- *lævis* (Müll.)
- Amalia sowerbii* (Fér.)
- *gagates* (Drap.)
- Vitrina pellucida* (Müll.)
- Vitrea crystallina* (Müll.)
- *alliaria* (Miller). Recorded from several places ; but specimens thus labeled have, so far as seen, proved to be the next species
- *glabra* (Brit. Auct.). Costessey
- *cellaria* (Müll.)
- *nitidula* (Drap.)
- *pura* (Ald.). Caistor St. Edmunds, Dunston
- *radiatula* (Ald.). Near Norwich
- *nitida* (Müll.). Plentiful in the Broad district
- *fulva* (Müll.)

- Arion ater* (Linn.)
- *bortensis*, Fér.
- *circumscriptus*, John. St. Germans
- *intermedius*, Norm. One or two places south of Norwich
- Punctum pygmæum* (Drap.)
- Pyramidula rotundata* (Müll.)
- Helicella virgata* (Da C.)
- *itala* (Linn.)
- *caperata* (Mont.)
- *cantiana* (Mont.). More plentiful south of Norwich than elsewhere in the county
- *cartusiana* (Müll.). One dead specimen near Long Stratton
- Hygromia granulata* (Ald.)
- *hispida* (Linn.)
- *rufescens* (Penn.)
- *Acanthinula aculeata* (Müll.). Norwich, Stratton Strawless
- Vallonia pulchella* (Müll.)
- Helicigona lapicida* (Linn.). Norwich, Framingham Earl
- *arbustorum* (Linn.)
- Helix aspersa*, Müll.
- *nemoralis*, Linn.
- *bortensis*, Müll.
- Buliminus obscurus* (Müll.)

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- Cochlicopa lubrica* (Müll.)
Cæcilianella acicula (Müll.)
Pupa cylindracea (Da C.)
 — *muscorum* (Linn.)
Sphyradium edentulum (Drap.). Rare : in a wood at Costessey
Vertigo antiveritigo (Drap.). Rare: Castle Rising
 — *substriata* (Jeff.). Bawsey, near Diss
 — *pygmæa* (Drap.)
 — *pusilla*, Müll. Earlham and Bowthorpe near Norwich
Balea perversa (Linn.). Thorpe near Norwich
Clausilia laminata (Mont.). Costessey; Framlingham (one specimen)
 — *bidentata* (Ström.)
Succinea putris (Linn.)
 — *elegans*, Risso

b. BASOMMATOPHORA

- Carychium minimum*, Müll.
Leuconia bidentata (Mont.). By railway bridge over Ouse, Lynn
Ancylus fluviatilis (Müll.). Norwich
Velletia lacustris (Linn.)
Limnæa auricularia (Linn.)
 — *pereger* (Müll.)
 — *palustris* (Müll.)
 — *truncatula* (Müll.)
 — *stagnalis* (Linn.)
 — *glabra* (Müll.). Reffley, North Runcton near Lynn

- Amphipeplea glutinosa* (Müll.). Norwich
Planorbis corneus (Linn.)
 — *albus*, Müll.
 — *glaber*, Jeff. River at Heigham
 — *nautilus* (Linn.). Local
 — *carinatus*, Müll.
 — *marginatus*, Drap.
 — *vortex* (Linn.)
 — *spirorbis*, Müll.
 — *contortus* (Linn.)
 — *fontanus* (Lightf.)
 — *lineatus* (Walker). Local : Whitlingham, Lynn, Thorpe
Physa fontinalis (Linn.)
 — *hypnorum* (Linn.). Rare : Thorpe, St. Germans, Yarmouth

II. PROSOBRANCHIATA

- Paludetrina ventrosa* (Mont.). Breydon
 — *stagnalis* (Bast.). Breydon, Wells
Bithynia tentaculata (Linn.)
 — *leachii* (Shepp.)
Vivipara vivipara (Linn.)
 — *contacta* (Millett)
Valvata piscinalis (Müll.)
 — *cristata*, Müll.
Pomatias elegans (Müll.). Whitlingham Wood, Drayton near Norwich
Acicula lineata (Drap.). Very rare : Caistor Wood
Neritina fluviatilis (Linn.)

B. PELECYPODA

- Dreissensia polymorpha* (Pall.). Breydon
Unio pictorum (Linn.)
Anodonta cygnæa (Linn.)
Sphærium corneum (Linn.)
 — *lacustre* (Müll.)
Pisidium amnicum (Müll.)

- Pisidium pusillum* (Gmel.)
 — *nitidum*, Jenyns. Rare : near Thetford
 — *fontinale* (Drap.). Common. The var. *benslowiana* has been taken at Lynn
 — *milius* (Held.). Rare : West Winch, St. Germans, Old Lakenham near Norwich

INSECTS

ORTHOPTERA

This order comprises the earwigs (*Forficulidæ*), the cockroaches (*Blattidæ*), the common grasshoppers (*Acridiidæ*), the long-horned grasshoppers (*Locustidæ*), and the crickets (*Gryllidæ*). In Norfolk we have besides the common earwig (*Forficula auricularia*), two other kinds, namely the small earwig, which is about half the size of the common kind and is frequently to be found flying in the day-time; and *Chelidura albipennis*, which may readily be distinguished from the common earwig by the absence of wings and the straighter and narrower pincers. It is not uncommon in the Norwich district, and may be obtained by beating mixed hedges in the autumn. It is a curious fact that although the common earwig is quite as well provided with wings as its smaller relative, it is very rarely seen on the wing, or found in situations to which it must necessarily have been transported by flight. Earwigs are said to be fond of their young, and the writer has on more than one occasion found a female of the common earwig with a dozen or more small young ones hidden away under a stone. In this case, however, it cannot be said that the young showed any disposition to avail themselves of parental protection, since mother and young promptly dispersed and ran into hiding in different directions. The cockroaches (*Blattidæ*) present two groups: the out-door, truly native species, which are small pale insects less than half an inch long; and the indoor, more or less naturalized species, which are of a dark mahogany brown colour, and in some cases attain a length of more than two inches. The common house cockroach, or so-called 'black-beetle' (*Periplaneta orientalis*), is easily known in the male sex by the shape of the upper wings, which appear as if they had been cut off straight across at some distance from the end of the body. In the females the upper wings are small and scale-like, and the lower pair are quite rudimentary. The song or chirp of the grasshoppers (*Acridiidæ*) is of course well known, but it is, perhaps, not so generally known that each kind has its own song, and that it is possible with a little attention to the difference in the sounds produced to distinguish some of the common grasshoppers (*Stenobothrus*) even when the insects are not in sight. The sound, which is produced by rubbing together the outer face of the upper wing and the inner face of the hind thigh, is the result of a rapid vibration of the upper wing set up by the friction between one or more

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projecting veins on the latter and a row of minute bead-like prominences, or some similar apparatus, situate on the thighs of the hind pair of legs. The common grasshoppers, especially the females of *Stenobothrus parallelus*, which may be known by their abbreviated upper wings, afford excellent examples of what is known as 'protective coloration,' the colour of the insects often exhibiting a marked similarity to that of the ground vegetation. A few stragglers of the migratory locust have from time to time been found in Norfolk; but it may be remarked, in passing, that the 'locust' of the country folk is *Rhizotrogus solstitialis*, a rather stout pale brown hairy beetle about three-fourths of an inch long, which may be seen in hundreds flying round trees and hedgerows in the summer twilight. Perhaps the best-known member of the long-horned grasshoppers (*Locustidæ*) is the great green grasshopper (*Locusta viridissima*). This insect is not uncommon in Norfolk, but is very intermittent in its occurrence; it often betrays its presence by its peculiarly harsh cry. Another member of the same group (*Xiphidium dorsale*), a pale green insect, reddish on the back, with very slender antennæ more than twice as long as the body, may be found commonly by sweeping low herbage in the fens of east Norfolk; its female is remarkable for its large sword-shaped tail, which is nearly as long as the body of the insect. The crickets (*Gryllidæ*) are well represented in this county, the house and field crickets are both abundant, and that grand insect, the mole cricket (*Gryllotalpa vulgaris*), will probably prove to be generally distributed if properly searched for.

The name of *Æcanthus pellucens* has been retained in the following list because the Norfolk record is the only one of its occurrence in Britain. The record of an insect of which a single specimen only has been taken, and that, probably, some time prior to the year 1812, is necessarily attended with some doubt, which in the present case is somewhat increased by the fact that the late Professor Westwood, who purchased the insect at the sale of Haworth's collection, said that the specimen had been misnamed, and was in no manner related to the insect in question. This statement would have been entitled to more weight had the learned professor stated what the proper name of the insect really was. I have ascertained from Professor Poulton, the present custodian of Westwood's insects at the Oxford Museum, that this specimen ex coll. Haworth cannot now be found; and Mr. Malcolm Burr, a specialist in Orthoptera who has often been through the Orthoptera collections there, has not been more successful in his endeavours to find it. There is evidence that Haworth collected at Halvergate, where his brother-in-law Robert Scales had a farm between the years 1808 and 1812; and the fact remains that the entomologists of his day believed that he had taken a specimen of *Æcanthus* there; and as the insect had already been figured by Panzer there appears no initial reason for assuming an error of identification. On the continent the species has occurred as far north as Fontainebleau.

In the following list two species which have not occurred to the

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author have been given on the authority of J. F. Stephens (*Illustrations of British Entomology*).

FORFICULIDÆ

- Labia minor, L.
- Forficula auricularia, L.
- Chelidura albipennis, Meg. *Norwich*

BLATTIDÆ

- Ectobia panzeri, Steph.
- Phyllodromia germanica, L.
- Periplaneta orientalis, L.

ACRIDIDÆ

- Mecostethus grossus, L. *Horning*
- Stenobothrus viridulus, L.
- bicolor, Charp.
- elegans, Charp. *Cley, October*
- parallelus, Zett.
- Gomphocerus maculatus, Thunb.
- Pachytylus migratorius, L. *Yarmouth*
(Stephens)

ACRIDIDÆ (continued)

- Tettix bipunctatus, L.
- subulatus, L.

LOCUSTIDÆ

- Leptophyes punctatissima, Bosc.
- Meconema varium, Fab. *Arminghall*
- Xiphidium dorsale, Latr. *Horning, Ran-*
worth
- Locusta viridissima, L.
- Thamnotrizon cinereus, L.

GRYLLIDÆ

- (?) Cæcanthus pellucens, Scop. *Halvergate*
(Haworth *fide* Stephens)
- Gryllus campestris, L.
- domesticus, L.
- Gryllotalpa vulgaris, Latr. *Stoke Holy Cross*

NEUROPTERA¹

Three families in this order, namely, the stone-flies (*Perlidae*), the May-flies (*Ephemeridae*), and the alder-flies (*Sialidae*), contain insects which are well known to anglers as excellent baits. Owing to the absence from Norfolk of swift torrents and waterfalls the *Perlidae* are represented by very few species, although individuals are sufficiently numerous in the neighbourhood of water. The *Ephemeridae*, apart from the interest attaching to the mode of flight in some species, are worthy of notice on account of the development of the eyes. These organs, which are more highly developed in the males than in the females, are very large and prominent. The males of certain species bear on the head, in addition to the two globose compound eyes and the three simple eyes (*ocelli*), two short, stout, slightly diverging pillars, the top of each of the latter being occupied by a large compound eye; so that the insect has in fact, seven eyes in all. The dragon-flies (*Odonata*), notwithstanding their forbidding appearance, may really be caught and handled without risk of injury—although it would be difficult to persuade a rustic to handle a ‘horse-stinger,’ as they are sometimes called. They may occasionally be taken when at rest after sundown or in dull weather, but otherwise the capture of the larger species calls for the exercise of much patience.

¹ In the following list of *Neuroptera* the determinations of species recorded from the collection of the author have been made or confirmed by R. McLachlan, F.R.S. In the case of species which have not occurred to the author, the names of the captors or recorders have been added after each entry. The entomologists referred to in this list are: C. G. Barrett, F.E.S.; John Curtis, in *British Entomology*; W. E. Leach, M.D., etc.; W. J. Lucas, F.E.S., in *The Entomologist*, xxxiii. p. 201; R. McLachlan, F.R.S.; Edward Newman, F.L.S., F.Z.S.; C. J. and J. Paget, in *A Sketch of the Natural History of Great Yarmouth and Neighbourhood*; J. F. Stephens, in *Illustrations of British Entomology*; H. J. Thouless of Norwich.

For the *Trichoptera* the nomenclature and sequence is that of McLachlan, *Trans. Ent. Soc. Lond.*, 1882, p. 329; and for the *Ephemeridae* that of Eaton, *Ent. Mo. Mag.* xxv. p. 10, *et seq.*

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and considerable dexterity in the use of the net. So far as the number of different kinds is concerned, these insects are scarcely so well represented in Norfolk as might reasonably be expected, several species which occur not uncommonly in the London district being as yet unrecorded for this county. On the other hand, Norfolk appears to be the only county where one particular species of *Æschna* is now to be found. This is *Æschna isosceles*, Mull., an insect about $2\frac{1}{2}$ inches long, having a bright sienna-brown body with a triangular yellow spot just behind the base of the hind-wings. Something like sixty years ago it appears to have been not uncommon at Yarmouth, but it has been entirely lost sight of for many years, the most recent recorded examples being one taken by my colleague Mr. Thouless in the Norwich district within the last few years and two taken near Norwich in 1871 by Mr. Barrett. The snake-flies (*Rhaphidiidæ*) are easily recognized by their comparatively broad flat head and the neck-like appearance of the parts succeeding it; they are rare insects, and occur only in wooded districts, where their larvæ are believed to feed on insects that harbour in old timber. The females have a long slender exerted ovipositor. We have in Norfolk three out of the four British species, and with regard to one of these (*R. cognata*, Rbr.) Mr. McLachlan writes that he had never previously seen a native example less than sixty or more years old. The specimen in question was taken by Mr. Thouless in Foxley Wood, on the 14th June, 1886. The lacewing-flies (*Chrysopidæ*), sometimes called 'golden-eyes,' are really common insects, though not frequently noticed. They are however of considerable importance since their larvæ, which feed most voraciously on aphides, are to a great extent instrumental in keeping these pests in check. The aphidivorous habits of the larvæ of the allied family *Hemerobiidæ* are equally noteworthy; and the larvæ of some at least of the species in that family have the habit of covering themselves with the empty skins of the aphides which they have sucked. The scorpion-flies (*Panorpidæ*), so called from the resemblance of the hind part of the body in the male to the tail of a scorpion, are also remarkable for the shape of the head, which is drawn out into a broad deflexed beak. Besides the common and well known scorpion-flies (*Panorpa*), the family *Panorpidæ* contains *Boreus hiemalis*, which is of local interest from the fact that the first recorded British example was taken by Dr. Leach very many years ago at Costessey. The *Boreus* is a curious little insect about one-fourth of an inch long, and looks like a minute wingless scorpion-fly; it occurs occasionally in moss from October to March, but has not, apparently, been taken in Norfolk for more than seventy years. The caddis-flies (*Trichoptera*) are moth-like insects of small or moderate size, sober colours and retiring habits; the surface of their upper wings is more or less closely covered with hairs. Their larvæ are aquatic, and the curious cases which they make of pieces of grass stems, small fresh-water shells, and aquatic debris generally are probably more familiar to non-entomological observers than the perfect insects.

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PSEUDO-NEUROPTERA

PSOCIDÆ

- Atropos divinatoria*, Müll.
- Psocus longicornis*, F.
- *nebulosus*, Steph.
- *variegatus*, F.
- *fasciatus*, F.
- *sexpunctatus*, L.
- *bifasciatus*, Latr.
- *quadrimaculatus*, Latr.
- *morio*, Latr. *Thetford* (Curtis)
- Stenopsocus immaculatus*, Steph.
- *cruciatus*, L.
- Cæcilius pedicularius*, L.
- *flavidus*, Steph.
- *vittatus*, Dalm.
- Peripsocus phæopterus*, Steph.
- Elipsocus unipunctatus*, Müll.
- *flaviceps*, Steph.
- *abietis*, Kolbe

PERLIDÆ

- Leuctra geniculata*, Steph.
- (?) *fusciventris*, Steph. It is probable that two species are included under this name
- Nemoura variegata*, Ol.
- (?) *cinerea*, Ol.

EPHEMERIDÆ

- Ephemera vulgata*, L.
- *danica*, Müll. *Bopton Common*
- Leptophlebia marginata*, L.
- *submarginata*, Steph.
- Habrophlebia fusca*, Curt.
- Ephemerella ignita*, Poda.
- Cænis dimidiata*, Steph.
- *halterata*, F.
- Baëtis binoculatus*, L.
- *vernus*, Curt.
- *pumilus*, Burm.
- *niger*, L.
- Centroptilum luteolum*, Müll.
- Cloëon dipterum*, L.
- Rhithrogena semicolorata*, Curt.
- Heptagenia sulphurea*, Müll.
- Ecdyurus venosus*, F.
- *insignis*, Etn.

ODONATA

LIBELLULIDÆ

- Sympetrum striolatum*, Charp.
- Platetrum depressum*, L.
- Libellula quadrimaculata*, L.
- *fulva*, Müll. *Sproston* (Curtis)
- *cancellatum*, L. *Horning, Fakenham* (Curtis)

CORDULIDÆ

- Cordulia ænea*, L.

GOMPHIDÆ

- Cordulegaster annulatus*, Latr.

ÆSCHNIDÆ

- Brachytrion pratense*, Müll.
- Æschna juncea*, L.
- *cyanea*, Müll.
- *grandis*, L.
- *isosceles*, Müll. *Yarmouth* (Newman); *Halvergate* (Stephens); near *Norwich* (Barrett); *Drayton Drewray* (Thouless)

CALOPTERYGIDÆ

- Calopteryx virgo*, L.
- *splendens*, Harr.

AGRIONIDÆ

- Lestes sponsa*, Hans.
- Platycnemis pennipes*, Pall. *Norfolk* (Curtis)
- Pyrrosoma nymphula*, Sulz.
- Ischnura pumilio*, Charp. *Norfolk*, 1899 (Lucas)
- *elegans*, Lind.
- Agrion puella*, L.
- Enallagma cyathigerum*, Charp.

NEUROPTERA-PLANIPENNIA

SIALIDÆ

- Sialis lutaria*, L.

RAPHIDIIDÆ

- Raphidia xanthostigma*, Schum.
- *cognata*, Ramb. (Thouless)
- *maculicollis*, Steph.

HEMEROBIIDÆ

- Micromus variegatus*, F.
- *paganus*, L.
- Hemerobius micans*, Ol.
- *humuli*, L.
- *marginatus*, Steph.
- *stigma*, Steph.
- *pini*, Steph.
- *subnebulosus*, Steph.
- *lutescens*, F.
- *concinus*, Steph.

CHRYSOPIDÆ

- Chrysopa flava*, Scop.
- *vittata*, Wesm.
- *alba*, L.
- *vulgaris*, Schn.
- *abbreviata*, Curt. *Yarmouth*, June (Paget)
- *perla*, L.
- Nothochrysa capitata*, F.

CONIOPTERYGIDÆ

- Coniopteryx psociformis*, Curt. *Norfolk* (Curtis)
- *tineiformis*, Curt.

PANORPIDÆ

- Panorpa communis*, L.
- *germanica*, L.
- *cognata*, Ramb.
- Boreus hyemalis*, L. *Cassey*, December, before 1826 (Leach)

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TRICHOPTERA

INÆQUIPALPIA

PHRYGANEIDÆ

- Neuronia ruficrus, Scop.
- Phryganea grandis, L.
- Agrypnia pagetana, Curt.

LIMNOPHILIDÆ

- Colpotaulius incisus, Curt.
- Grammotaulius nitidus, Müll.
- atomarius, F.
- Glyphotælius pellucidus, Retz.
- Limnophilus rhombicus, L.
- flavicornis, F.
- marmoratus, Curt.
- lunatus, Curt.
- centralis, Curt.
- affinis, Curt.
- auricula, Curt.
- xanthodes, McLach. *Norfolk Fens*
(Winter, *fide* McLachlan)
- politus, McLach. *Norfolk Fens* (Mc-
Lachlan)
- griseus, L.
- bipunctatus, Curt. *Norfolk Fens* (Mc-
Lachlan)
- extricatus, McLach.
- luridus, Curt. *Norfolk Fens* (McLachlan)
- sparsus, Curt.
- fuscicornis, Ramb.
- Anabolia nervosa, Curt.
- Stenophylax stellatus, Curt.
- concentricus, Zett.
- vibex, Curt. *Norfolk* (Curtis)
- Halesus radiatus, Curt.
- digitatus, Schrank.

LIMNOPHILIDÆ (*continued*)

- Drusus annulatus, Steph.
 - Chætopteryx villosa, F.
- #### SERICOSTOMATIDÆ
- Notidobia ciliaris, L.
 - Goëra pilosa, F.
 - Silo pallipes, F.
 - nigricornis, Pict.
 - Brachycentrus subnubilus, Curt.
 - Lepidostoma hirtum, F.

ÆQUIPALPIA

LEPTOCERIDÆ

- Beræa pullata, Curt.
- Odontocerum albicorne, Scop.
- Leptocerus bifasciatus, L.
- fulvus, Ramb. *Fens* (McLachlan)
- Mystacides azurea, L.
- Æcetis furva, Ramb. *Norfolk Fens* (Win-
ter *fide* McLachlan)

HYDROPSYCHIDÆ

- Hydropsyche angustipennis, Curt.
- Plectronemia conspersa, Curt.
- Polycentropus flavomaculatus, Pict.
- Holocentropus dubius, Ramb. *Fens* (Mc-
Lachlan)
- picicornis, Steph.
- Tinodes wæneri, L.
- Ecnomus tenellus, Ramb. *Fen district*
(Winter *fide* McLachlan)

RHYACOPHILIDÆ

- Rhyacophila dorsalis, Curt.

HYDROPTILIDÆ

- Agraylea multipunctata, Curt.

HYMENOPTERA

The sawflies of the following list have mostly been collected in the neighbourhood of Norwich ; but a few have been obtained elsewhere by Messrs. F. Norgate and E. A. Atmore. Doubtless much more could be done in this group by working the eastern part of Norfolk. There are a few notices in Paget's *Natural History of Yarmouth*, Curtis's *British Entomology* and *Farm Insects*, and Stephens's *Illustrations of British Entomology*, which have been used.

The economy of the sawflies is extremely interesting. They are, in the larval state, vegetable feeders. The majority feed on the outside of the leaf, but a few are leaf-rollers, some mine the leaves, others form galls on the leaves of various species of willow and on poplar, and two or three make woolly galls on the young shoots of willows.

In some species the male fly is very rare, and in a few instances

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quite unknown. The male of the common sawfly which makes the galls found on almost every willow (*Nematus gallicola*), is exceedingly rare. The late Mr. J. B. Bridgeman, of whose arduous labours the present list is a result, thought himself fortunate to rear one. The male of the very common *Eriocampa ovata*, the female of which abounds everywhere among alders, is quite unknown. This is a case of *parthenogenesis*, the eggs of the virgin female producing larvæ in due course, and ultimately the perfect insects. These have been reared by Messrs. Cameron and J. E. Fletcher.

On working out the Aculeates much help has been given by the Rev. J. Landy Brown, Messrs. H. D. Geldart, T. G. Bayfield, and E. A. Atmore; the late Mr. Frederick Smith of the British Museum confirmed the accuracy of many of the captures, and Mr. Edward Saunders has brought several species to light which had been mixed with others and so overlooked. Several entomologists early in the century collected species of this group in Norfolk. The Rev. W. Kirby, author of *Mono-graphia Apum Angliæ*, mentions four bees which he had taken near Norwich; Curtis, Stephens and Paget, already alluded to, added to this information; and Mr. F. Smith published the results of his collecting at Cromer and Mousehold in the *Entomologists Annual* for 1868-69.

In Curtis's *Entomology* two bees are recorded which, though not included in the following list, should be noticed. The first is *Andrena kirbii*. It is figured and described, and the following note is appended:—

‘The rare insect figured was in the collection of the late Mr. W. Griffin of Norwich, and was probably taken in the neighbourhood of that city; it now enriches the cabinet of Mr. Stephens.’ With the rest of Mr. Stephens' treasures it is now in the collection of the British Museum, and was included in the first edition of the *Catalogue of British Bees*, by Mr. F. Smith, but was deleted in the second edition, published in 1877, in the introduction to which the following remark appears: ‘Ten species are entirely new additions to this part of the British fauna, whilst two, formerly believed to be British, have been omitted, *Sphcodes fuscipennis* and *Andrena kirbii*.’ The other species is *Heriades truncorum*, a very rare insect, of which Curtis says, ‘I believe that my female came from Norfolk.’ Concerning both species some doubt exists, and it is very uncertain whether the first named is a British insect.

Of the *Ichneumonidæ* this list is doubtless far from complete. Parasitic Hymenoptera have been much neglected in this county, especially the Ichneumons, owing doubtless to the absence of any handbook on the subject in the English language. Much assistance has been given by the Rev. T. A. Marshall; and lepidopterists have supplied information of the species inadvertently reared by them from larvæ of their favourite groups, as well as of those which they have captured. Many species also were obtained by sweeping herbage by the side of ditches, and the banks beneath hedges; also in dull weather by beating hedges into an old umbrella, but this will not serve when the sun shines, since the insects are then far too active to be thus secured. When a good hunting ground

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is found it does not seem to matter how often it is visited, as something fresh is almost sure to be taken.

There is a peculiar habit found in the larva of *Limneria kreichbaumeri* when in the cocoon ; it has the power of leaping a considerable distance into the air. The cocoon is semitransparent, and when held up to the light the larva may be seen to bend itself into the shape of a U ; then press its head and tail against one side of the cocoon, and suddenly release them so that they strike the opposite side, hitting it a sharp blow which causes it to make a leap. When held in the fingers the tap may distinctly be felt and heard.

TENTHREDINIDÆ

- Tenthreda livida*, Linn. *Norwich* ; common, June and July
- *colon*, Klug. *Norwich* ; one female on *Mousehold*
- *solitaria*, Scop. *Sparham* ; two females taken by Mr. F. Norgate in June
- *rufiventris*, Panz. *Sparham* ; three females taken by Mr. F. Norgate in June
- *dispar*, Klug. Twice taken in the county ; once at *Feltborpe* in June
- *maculata*, Fourc. Taken by Mr. Norgate, probably at *Sparham*
- *bicincta*, Linn. Common
- *mesomela*, Linn. Common at midsummer
- *obsoleta*, Klug. Taken at *Lynn* by Mr. E. A. Atmore
- *olivacea*, Klug. One female taken by Mr. Norgate and another by Mr. Atmore
- *punctulata*, Klug. Common
- *viridis*, Linn. Common
- *lateralis*, Fab. *Norwich* ; in May and June, not common
- *gibbosa*, Fall. Common, occurring as early as April
- Tenthredopsis cordata*, Fourc. *Norwich* ; apparently uncommon
- *microcephala*, Sep. *Norwich*, *Lynn*
- *caliginosa*, Step. Once taken
- *nigricollis*, Cam. *Norwich*, *Lynn* ; common
- *ornata*, Sep. *Salhouse*, June
- *tristis*, Step. Taken by Mr. E. A. Atmore at *Lynn*, in June
- *dorsivittata*, Cam. *Earlham* ; end of May, uncommon
- *inornata*, Cam. *Norwich* ; June
- *nassata*, Linn. } Common in June
- *sordida*, Klug. }
- Synærema rubi*, Panz. Recorded in *Norfolk* by Stephens
- Pachyprotasis rapæ*, Linn. Very common
- *simulans*, Klug. One specimen taken

TENTHREDINIDÆ (continued)

- by Mr. F. Norgate, probably near *Sparham* ; rare
- Macrophya blanda*, Fab. *Norwich* ; June, common
- *neglecta*, Klug. *Norwich* ; June, common
- *12-punctata*, Linn. Twice taken : once at *Wroxham* ; once at the osier-carr at *Heigham*—this locality since destroyed
- *albicincta*, Sch. *Brundall* ; end of May
- *ribis*, Schr. *Brundall*, *Eaton* ; single specimens, at the end of May and beginning of June
- *rustica*, Linn. Very common
- *punctum-album*, Linn. *Norwich* ; in privet hedges, in June
- Allantus scrophulariæ*, Linn. *Brundall*, *Postwick* ; about *Scrophularia nodosa*
- *tricinctus*, Fab. *Brundall* ; August, not common
- *marginellus*, Fab. *Earlham* ; June, not common
- *arcuatus*, Först. Very common
- Dolerus vestigialis*, Klug. *Norwich*, *Brundall* ; two specimens, in May and June
- *triplicatus*, Klug. Very rare ; one taken by Mr. F. Norgate at *Sparham*, in June, 1880
- *fulviventris*, Scop. Common among *Equisetum*
- *anticus*, Klug. *Brundall* ; end of April
- *arcticus*, Thom. *Brundall* ; two males, May and June
- *gonagra*, Fab. Very common
- *puncticollis*, Thom. *Brundall* ; uncommon, end of May
- *hæmatodes*, Schr. Common
- *anthracinus*, Klug. Rare ; one at *Eaton*, in May
- *fissus*, Hgt. Common
- *varispinus*, Hgt. Rare ; *Norwich*, three taken in spring
- *intermedius*, Cam. *Norwich*, *Brundall* ; not uncommon, April and May

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TENTHREDINIDÆ (continued)

- Dolerus niger*, Linn. Common in June
 — *æneus*, Hgt. *Norwich, Lynn*; May, June, not uncommon
 — *elongatus*, Thom. Not uncommon
Strongylogaster cingulatus, Fab. Female common among ferns
Selandria serva, Fab. Very common at midsummer in marshes
 — *sixii*, Voll. *Norwich, Brundall*
 — *flavescens*, Klug. *Norwich, Brundall*; May, June, July
 — *straminipes*, Klug. *Norwich, Salhouse*, on fern; May, June
 — *morio*, Fab. *Brundall*; August
 — *aperta*, Hgt. *Buckenham*; one female only
Taxonus equiseti, Fall. Common
 — *glabratus*, Fall. Common
Pœcilosoma luteolum, Klug. Not uncommon in marshy places; larva feeding upon *Lysimachia vulgaris*
 — *pulveratum*, Retz. *Sparham, Brundall, Lynn*
 — *longicorne*, Thom. *Norwich*; May, June
 — *submuticum*, Thom. *Strumpsbaw, Brundall*; end of May and June
 — *excisum*, Thom. *Earlham*; one male only, taken in August
Eriocampa ovata, Linn. Common on alder; the female only is known
 — *annulipes*, Klug. *Norwich, Brundall*; common, June, July
 — *varipes*, Klug. *Norwich, Brundall*; not scarce, June to August
 — *limacina*, Retz. *Norwich*; common, on fruit trees
 — *cinxia*, Klug. *Earlham*; one female in August, 1878
 — *rosæ*, Harris. *Norwich, Wroxham*; common in May
Blennocampa sericans, Hgt. *Brundall*; one male in May, 1882
 — *nigrita*, Fab. *Norwich*; end of May, not uncommon
 — *albipes*, Gmel. *Norwich, Brundall*; common in May
 — *ruficruris*, Brullé. *Norwich, Brundall*; May, in numbers
 — *nigripes*, Klug. *Heigham*, August
 — *fuscipennis*, Fall. *Brundall*; marshy places, in June
 — *ephippium*, Panz. *Brundall, Hellesdon*; common at midsummer
 — *fuliginosa*, Sch. *Norwich, Brundall*; May to July
 — *subserata*, Thom. *Brundall*; May to July

TENTHREDINIDÆ (continued)

- Blennocampa pusilla*, Klug. *Norwich*; common in May and June
 — *betuleti*, Klug. *Mousehold*; one female in August, 1880
 — *assimilis*, Fall. *Norwich*; two females only, in May
Hoplocampa ferruginea, Panz. Recorded by Stephens as rare in Norfolk
 — *cratægi*, Klug. *Norwich*; about flowers of whitethorn at the end of May
Emphytus togatus, Panz. *Earlham, Sparham*; rare
 — *cinctus*, Linn. Common on wild and garden roses
 — *calceatus*, Klug. *Brundall*; August
 — *tibialis*, Panz. *Sparham*; taken by Mr. Norgate in September
 — *carpini*, Hgt. *Norwich*; frequent in May
 — *grossulariæ*, Klug. *Norwich*; not uncommon, May to July
 — *tener*, Fall. *Norwich*; common at midsummer
 — *perla*, Klug. *Norwich*; rare
Phyllotoma vagans, Fall. Common on alder, the larva mining in the leaves
 — *microcephala*, Klug. *Norwich, Brundall, Lynn*; July and August
 — *fumipennis*, Cam. A single specimen taken on alder at *Brundall*, May, 1878. Found to be a new species
Fenusa melanopoda, Cam. *Norwich*; on alder, in July
 — *pumilio*, Hgt. *Norwich*; May and August
 — *pygmæa*, Klug. *Earlham, Lynn*; single specimens only
 — *pumilla*, Klug. *Norwich*; bred from leaves of birch
 — *ulmi*, Sun. *Norwich*; end of May and June
Athalia ancilla, Sep. Common in June
 — *spinarum*, Fab. Formerly a destructive pest among turnips; I do not know that it has recently been taken at all
 — *rosæ*, Linn. Abundant everywhere
 — *lugens*, Klug. *Brundall*; scarce, May and August
Hemichroa alni, Linn. Female common on alder in June; male rare
 — *rufa*, Panz. *Norwich*; rare
Dineura stilata, Klug. Abundant everywhere in hedges
 — *verna*, Klug. *Norwich, Lynn*; single specimens only
 — *viridorsata*, Retz. *Norwich*; rare, May, June

A HISTORY OF NORFOLK

TENTHREDINIDÆ (continued)

- Cladius pectinicornis*, Fourc. Common, usually in gardens
 — *rufipes*, Sep. One at Eaton in August, 1881
 — *eradiatus*, Htg. *Norwich*; April to June; also bred from perforated bramble sticks collected in winter
 — *drewseni*, Thom. *Norwich*; May, June, scarce
 — *padi*, Linn. Very abundant
Croesus latipes, Villaret. *Lynn*; taken by Mr. Atmore in May, 1887
 — *septentrionalis*, Linn. *Downham*; Mr. Norgate
Nematus fulvipes, Fall. *Brundall*; July, August
 — *hibernicus*, Cam. Two specimens at *Norwich* and one at *Lynn*
 — *crassicornis*, Htg. *Norwich*; May to July
 — *appendiculatus*, Htg. *Norwich*; two females only
 — *cæruleocarpus*, Hgt. *Eaton*; two males in June
 — *lucidus*, Panz. *Norwich*, *Sparham*; May, June
 — *capreæ*, Panz. Common
 — *obductus*, Htg. *Norwich*, *Brundall*; end of May to July
 — *leucogaster*, Htg. *Norwich*, *Brundall*, *Felthorpe*; July, August
 — *curtispinga*, Thom. *Heigham*; one, in June
 — *viridescens*, Cam.
 — *glutinosæ*, Cam. *Lynn*; one male, by Mr. Atmore in June
 — *miliaris*, Panz. Common on willows
 — *tibialis*, Newm. A single female taken many years ago
 — *myosotidis*, Fab. Common; June to August
 — *abdominalis*, Panz. A single specimen taken in *Heigham Osier Car*
 — *ruficapillus*, Gmel. Very common
 — *ribesii*, Scop. Very common on gooseberry bushes
 — *albipennis*, Htg. *Norwich*, *Brundall*, *Felthorpe*
 — *xanthogaster*, Foer. *Norwich*, *Brundall*; April to August, common
 — *leucostictus*, Htg. *Brundall*, *Lynn*; May, June
 — *gallicola*, West. Female abundant on willows, the male is very rare
 — *bridgemanii*, Cam. *Brundall*; from galls on willow
Cimbex sylvarum, Fab. Stephens says that it has been taken in *Norfolk*

TENTHREDINIDÆ (continued)

- Trichiosoma lucorum*, Linn. *Sparham*; taken by Mr. Norgate
 — *betuleti*, Klug. *Norwich*; common on whitethorn hedges
Abia sericea, Leach. *Brundall*, on flowers of scabious; *Dilham*, on alder
Hylotoma ustulata, Linn. *Eaton*, *Cringleford*, *Brundall*; May, not uncommon
 — *atrata*, Foer. *Sparham*; one female taken by Mr. Norgate
 — *melanochroa*, Gmel. *Eaton*; June, twice captured
 — *cyanocrocea*, Foer. *Norwich*; common
 — *rosæ*, Linn. Generally distributed
Lyda sylvatica, Linn. *Norwich*; two specimens only
Xyela pusilla, Dalb. Recorded in *Norfolk* by Curtis
Cephina pygmæus, Linn. Very common
 — *pallipes*, Klug. *Felthorpe*, *Lynn*; July
 — *floralis*, Klug. One specimen recorded by Stephens
 — *tabidus*, Fab. *Earlham*; one female specimen

CHRYSIDIDÆ

- Cleptes semiauratus*, Linn. *Norwich*, *Yarmouth*; July, common
 — *nitidulus*, Fab. *Yarmouth*; on the sandhills
Ellampus panzeri, Fab. *Eaton*, *Mousehold*; three specimens from flowers in August, 1875
Homalus auratus, Linn. Common
 — *cæruleus*, de G. Common
Hedychrum lucidulum, Fab. *Eaton*, *Mousehold*; July; in plenty at the latter locality about a mixed colony of *Cerceris arenaria*, *C. labiata* and *C. ornata*
 — *ardens*, Curt. *Eaton*; taken sparingly in June
 — *roseum*, Rossi. *Mousehold*; two specimens, in August
Chrysis ignita, Linn. Abounds from the end of May about old posts, rails and walls
 — *viridula*, Linn. *Harford Bridges*; June
 — *cyanea*, Linn. Abundant everywhere
 — *austriaca*, Fab. *Eaton*, two specimens in June, one at *Brundall*

ACULEATA

HETEROGYNA

- Formica fusca*, Linn. Abundant everywhere
 — *fuliginosa*, Latr. Common about decayed trees
 — *nigra*, Linn. Abundant everywhere
 — *flava*, de Geer. Generally common

INSECTS

HETEROGYNA (continued)

- Camponotus herculeana*, Linn. Females and neuters found alive (among timber from *New Brunswick*) in a sawyard at *Norwich*, in April, 1877
- Tetramorium lippula*, Nyl. One male taken near *Norwich* in 1878
- Myrmica ruginodis*, Nyl. *Norwich*; not very common
- *scabrinodis*, Nyl. Very common
- *lævinodis*, Nyl. Plentiful in the *Norwich* district
- *lobicornis*, Fab. *Mousehold*; taken by Mr. Thoulless in 1886; a rare species
- Leptothorax acervorum*, Fab. Neuters were taken from the trunk of an old tree at *Earlham* in 1888
- Diplorhoptum domesticum*, Shuck. This little pest, the red house-ant, is to be found in some of the houses in *Norwich*

FOSSORES

- Mutilla ephippium*, Fab. *Norwich*; on dry sunny banks, in August
- Myrmosa melanocephala*, Fab. *Norwich* district; end of July
- Tiphia femorata*, Fab. *Norwich*, *Cromer*; on *Umbelliferæ*, end of July and in August
- *minuta*, Lind. *Eaton*, *Mousehold*; a few females, end of June and beginning of July
- Sapyga 5-punctata*, Fab. *Brundall*; July
- Pompilus fuscus*, Linn. Common everywhere
- *trivialis*, Dahlb. On every dry bank
- *consobrinus*, Dahlb. *Norwich*
- *pectinipes*, Linn. *Mousehold*
- *plumbeus*, Fab. *Yarmouth*, *Cromer*, *Bawsey Heath*
- *niger*, Fab. Recorded in Paget's list
- *rufipes*, Linn. *Yarmouth*, *Earlham*; August
- Priocnemis sepicola*, Smith. In hedgerows, commonly in the spring
- *affinis*, Lind. Recorded in Mr. Smith's catalogue, in *Norfolk*, in August and September
- *exaltatus*, Fab. Everywhere, in July and August
- *hyalinatus*, Fab. *Norwich*, in garden; *Mousehold*, in July, August and September
- *parvulus*, Dahlb. *Mousehold*; two females, September
- Agenia hircana*, Fab. *Earlham*, *Eaton*; two females and one male on trunks of trees, in June and July, 1878

FOSSORES (continued)

- Ceropales maculata*, Fab. *Norwich*; on *Umbelliferæ*, in August
- Ammophila sabulosa*, Linn. Abundant in May
- *viatica*, Linn. Less abundant, and appearing later
- *lutaria*, Fab. *Mousehold*; scarce
- Miscus campestris*, Latr. *Mousehold*; early in July
- Tachytes pompiliformis*, Panz. *Norwich*, *Cromer*; June, July, not rare
- Astata boops*, Schr. *Mousehold*; July, August, not common
- Nysson spinosus*, Fab. *Lakenham*, *Brundall*; May to July, frequent
- *trimaculatus*, Rossi. *Norwich*, *Heigham*, *Brundall*; July, August
- *dimidiatus*, Jurine. *Earlham*, *Eaton*, *Brundall*; July, August
- Gorytes mystaceus*, Linn. *Norwich*, *Brundall*; May and June, common
- *quadrifasciatus*, Fab. *Heigham*, *Brundall*, *Horning*; June, July
- Hoplisis bicinctus*, Rossi. *Eaton*; a fine female of this very rare wasp
- Harpactus tumidus*, Panz. Sandhills, *Yarmouth*, June; *Earlham*, *Eaton*, in July and August
- Mellinus arvensis*, Linn. *Eaton*, *Earlham*, *Mousehold*, *Brundall*, *Yarmouth*, *Bawsey Heath*; very common
- *sabulosus*, Fab. *Brundall*; July
- Trypoxylon figulus*, Linn. Very common
- *attenuatus*, Smith. Abundant
- *clavigerum*, St. Farg. Scarcer than the last two
- Crabro clavipes*, Linn. *Norwich*, *Harford Bridges*, *Earlham*; June to September
- *tibiale*, Fab. *Brundall*
- *signatus*, Panz. *Eaton*; one male, June, 1874; rare in this county
- *luteipalpis*, St. Farg. *Lynn*, *Norwich*, *Brundall*; June, July
- *podagricus*, Lind. *Brundall*; August, 1879
- *varius*, St. Farg. *Earlham*, *Brundall*; July, September
- *leucostoma*. *Norwich*; common
- *exiguus*, Shuck. *Earlham*; one specimen, July, 1874
- *walkeri*, Shuck. *Cromer*
- *wesmaeli*, Lind. *Cromer*; one specimen, August, 1877
- *obliquus*, Shuck. *Norwich*, *Brundall*, *Cromer*; August
- *quadrinaculatus*, Fab. Abundant, July and August
- *scutatus*, Fab. *Norwich*; July, August

A HISTORY OF NORFOLK

FOSSORES (continued)

- Crabro cephalotes, Panz. *Horning, Cromer, Brundall*; August
- cribrarius, Linn. } Very common
- patellatus, Panz. }
- palmipes, Linn. *Mousehold, Earlham*; males not rare
- vagus, Linn. *Brundall*; June, August
- chrysostomus, St. Farg. *Brundall*; June, August
- albilabris, Fab. *Norwich, Cromer*; very common
- panzeri, Lind. *Cromer*; taken by Mr. F. Smith, August, 1868
- brevis, Lind. *Norwich, Cromer*; abundant, August
- Oxybelus uniglumis, Linn. Abundant in summer on every dry bank
- mandibularis, Dahlb. *Norwich*; one male, identified by Mr. E. Saunders
- Spilomena troglodytes, Shuck. One specimen, flying about palings in *Norwich*, August, 1875
- Stigmus pendulus, Panz. *Norwich*; abundant about old palings in garden, June, July
- Diodontus minutus, Fab. Abundant everywhere
- luperus, Shuck. Equally plentiful with the last
- tristis, Lind. Less frequent than the last two
- Passalæcus cornigera, Shuck. Generally distributed
- brevicornis, Thoms. Common
- gracilis, Curt. One specimen only taken
- Pemphredon lugubris, Fab. Tolerably abundant
- Cemonus unicolor, Lind. } Very abundant,
- lethifer, Shuck. } June to August
- Psen pallipes, Panz. }
- Mimesa shuckardi, Wesm. *Mousehold, Eaton, Brundall*; scarce
- bicolor, Jurine. Generally distributed, July, August
- Cerceris arenaria, Linn. *Yarmouth, Mousehold*; July, August
- labiata, Fab. *Norwich, Bawsey Heath*; July, August
- ornata, Fab. Equally common with the last

DIPLOPTERA

- Odynerus sinuatus, Fab. *Heigham, Brundall*; July
- gracilis, Brullé. *Postwick*; taken by the Rev. J. L. Brown
- spinipes, Linn. *Harford Bridges, Brundall*; July

DIPLOPTERA (continued)

- Odynerus melanocephalus, Gmel. *Brundall*; one specimen, July, 1873
- parietinum, Linn. Not uncommon in some seasons
- parietum, Linn. Very abundant
- quadratus, Thoms. Equally abundant
- trifasciatus, Oliv. Not uncommon
- pictus, Curt. *Norwich*; occasionally taken
- antilope, Panz. *Lynn*; taken by Mr. E. A. Atmore
- Vespa crabro, Linn. Generally distributed
- vulgaris, Linn. } Common anywhere
- germanica, Fab. }
- rufa, Linn. Not uncommon
- sylvestris, Scop. Not rare; a nest was taken in 1875, out of a bank; it is not its usual habit to build underground
- norvegica, Fab. *Witton*; a nest taken in July, 1875, by the Rev. J. Landy Brown contained all three sexes; not otherwise noticed in *Norfolk*

ANTHOPHILA

- Colletes succincta, Linn. *Mousehold, St. Faiths, Bawsey*; abundant at heather bloom in August and September
- fodiens, Kirby. *Norwich, Yarmouth, Lynn*; July to September, at ragwort blossom
- picistigma, Thoms. *Norwich*; one female in July, 1875
- davesiana, Smith. About every sandy bank
- Prosopis communis, Nyl. Common; June till August
- confusus. *Earlham, Brundall*; not common, at flowers of bramble
- signata, Panz. Generally common, at flowers of mignonette
- hyalinata, Kirby. Common
- perforator, Smith. *Earlham*; at bramble flowers
- varipes, Smith. *Norwich*; one male
- Sphecodes gibbus, Linn. Generally distributed and common
- rufiventris, Wesm. Generally distributed and common
- subquadratus, Smith. *Brundall, Eaton*; uncommon
- ephippius, Linn. Very common
- pilifrons, Thom. } Taken with S.
- similis, Wesm. } rufiventris
- ferruginatus, Schenck. *Brundall*; one female
- variegatus, v. Hag. } Taken with S.
- dimidiatus, v. Hag. } ephippius
- affinis, v. Hag.

INSECTS

ANTHOPHILA (continued)

- Sphecodes puncticeps*, Thoms. One male only taken
- Andrena hattorfiana*, Fab. *Eaton, Wroxham*; July, 1876, at flowers of *Knautia arvensis*
- *decorata*, Smith. *Norwich, Brundall, Costessey*; end of July and in August, plentiful at bramble blossom
- *cetii*, Schr. *Eaton*; on flowers of *Knautia arvensis* in August
- *cingulata*, Fab. *Norwich*; May, June, in flowers of *Veronica chamædrys*
- *pilipes*, Fab. *Norwich*; occasional in May and June
- *thoracica*, Fab. *Norwich, Brundall, Wroxham*; April and May, and if the weather is hot, again at the end of July
- *nitida*, Fourc. *Norwich, Brundall, Lynn*; not common; end of April to June
- *vitrea*, Smith. *Mousehold, Brundall*; at flowers of bramble, July, scarce
- *albicans*, Kirby. Common everywhere
- *analıs*, Panz. *Felthorpe*; once taken in June, 1881
- *clarkella*, Kirby. *Yarmouth, Horning*; March
- *gwynana*, Kirby. Abundant in early spring on dandelion flowers
- *bicolor*, Fab. *Norwich, Brundall*; June, July
- *helvola*, Linn. *Norwich*; common, April to June
- *varians*, Rossi. *Norwich*; not so common
- *atriceps*, Kirby. One of the earliest of spring bees; abundant at sallow-bloom and other spring flowers
- *nigro-ænea*, Kirby. Abundant and generally distributed
- *trimmerana*, Kirby. *Norwich*; fairly common, April to June
- *pivicornis*, Kirby. *Mousehold, Cringleford*; three females and two males only taken, April
- *bimaculata*, Kirby. *Norwich, Brundall*; very local, April
- *smithella*, Kirby. *Norwich, Brundall*; plentiful
- *nigriceps*, Kirby. *Norwich*; female plentiful on ragwort flowers in July and August; male very rare
- *pubescens*, Kirby. *Mousehold*; at heather bloom, August
- *tridentata*, Kirby. *Mousehold and Eaton*; males common on ragwort flowers in July; female scarce

ANTHOPHILA (continued)

- Andrena angustior*, Kirby. *Mousehold*; one female only, May, 1875
- *fucata*, Smith. *Carbrooke*; taken by the Rev. J. L. Brown
- *aprilina*, Smith. One specimen taken in April, 1873
- *fulvicrus*, Kirby. One male taken at *Brundall* in 1874 by the Rev. J. L. Brown
- *albicus*, Kirby. Generally distributed and common; April and May
- *labialis*, Kirby. *Eaton, Harford Bridges, Brundall, Yarmouth, Lynn*; in June, but not common
- *chrysosceles*, Kirby. *Carbrooke, Eaton*; very rare
- *coitana*, Kirby. *Norwich, Brundall*; common in July and August
- *parvula*, Kirby. Very common; end of March
- *minutula*, Kirby. *Norwich, Lynn*; July, August, uncommon
- *nana*, Kirby. *Eaton, Earlham, Mousehold*; May, June
- *dorsata*, Kirby. Common at flowers of bramble; July, August
- *combinata*, Kirby. *Norwich, Brundall*; at sallow bloom; sometimes common
- *connectens*, Kirby. *Norwich*
- *fuscata*, Kirby. *Mousehold*; April, May
- *afzeliella*, Kirby. Common, April, May and end of July
- *convexiuscula*, Kirby. *Norwich*; plentiful, April to June
- *collinsonana*, Kirby. Recorded by Kirby as taken in the county in June, 1799
- *xanthura*, Kirby. Generally distributed; April, May
- Cilissa hæmorrhoidalis*, Fab. Frequent on flowers of *campanula*; July, August
- *leporina*, Panz. *Eaton, Brundall*; July, August, occasionally at the flowers of white clover
- Halictus rubicundus*, Kirby. Not uncommon at *Norwich*
- *leucozonius*, Schr. Very common
- *quadrinotatus*, Kirby. Abundant
- *cylindricus*, Fab. Common
- *malachurus*, Kirby. *Cromer*; taken by Mr. F. Smith
- *albipes*, Fab. Very common
- *fulvicornis*, Kirby. *Cromer*; taken by Mr. F. Smith
- *villosulus*, Kirby. *Norwich, Cromer*
- *tumulorum*, Linn. Very abundant

A HISTORY OF NORFOLK

ANTHOPHILA (*continued*)

- Halictus smeatmanellus*, Kirby. *Norwich*, *Brundall*, *Cromer*; occasional
- *ætatus*, Kirby } Very common
- *morio*, Kirby }
- *leucopus*, Kirby. *Norwich*; scarce
- *minutus*, Kirby. Generally distributed
- *nitidiusculus*, Kirby. Generally distributed
- *punctatissimus*, Schenck. *Norwich* district
- *minutissimus*, Kirby. Very common
- Dasypoda hirtipes*, Latr. *Caister Marrams*, near *Yarmouth*; August
- Macropis labiata*, Panz. *Brundall*; on flowers of creeping thistle, wild peppermint, marsh potentilla, and yellow loosestrife
- Panurgus banksianus*, Kirby. *Mousehold*, *Eaton*; very abundant from the end of June till August
- Nomada ruficornis*, Linn. Very common, end of April to June
- *lateralis*, Panz. *Brundall*, *Cringleford*; April and May
- *ochrostoma*, Kirby. *Earlham*, *Eaton*; one female each in June, rare
- *armata*, Schöff. *Eaton*; four females only
- *obtusifrons*, Nyl. *Brundall*; July and August, on flowers of the creeping-rooted thistle
- *flavoguttata*, Kirby. *Lynn*; end of May
- *furva*, Panz. Not uncommon, flying about the burrows of the small *Halicti* at the end of May and in June
- *solidaginis*, Panz. Plentiful on ragwort flowers, July, August
- *jacobææ*, Panz. Plentiful in 1874, otherwise not common
- *lineola*, Panz. *Mousehold*; end of May and in June
- *sexfasciata*, Panz. *Norwich*; about a colony of *Eucera longicornis* in a bank near *Thorpe Asylum*, end of May, June
- *alternata*, Kirby } Very common from
- *succincta*, Panz. } April to June
- Epeolus variegatus*, Linn. *Bawsey Heath*, near *Lynn*; common about burrows of *Colletes daviesana* in July and August
- Melecta armata*, Panz. Generally common about burrows of *Anthophora acervorum* from the end of March till May
- Stellis aterrima*, Panz. *Norwich*; in garden at flowers of *Coreopsis*, scarce

ANTHOPHILA (*continued*)

- Stellis phæoptera*, Kirby. *Brundall*; one specimen, in August, 1879
- Coelioxys quadridentata*, Linn. *Eaton*, *Postwick*, *Yarmouth*, *Lynn*
- *simplex*, Nyl. Very abundant, June, July
- *acuminata*, Nyl. Not uncommon
- *rufescens*, St. Farg. *Eaton*, *Mousehold*, *Brundall*
- Osmia rufa*, Linn. Abundant in early spring
- *ænea*, Linn. Not uncommon, April to June; female at red nettle
- *fulviventris*, Panz. *Norwich*, *Eaton*, *Brundall*, *Harford Bridges*; common, June, July
- *spinulosa*, Kirby. *Brundall*; two females from ragwort flowers, in July and August
- Chelostoma florissome*, Linn. *Harford Bridges*, June, July
- *campanularum*, Kirby. *Norwich*, in gardens, about flowers of *Campanula*
- Anthidium manicatum*, Linn. Abundant at midsummer
- Megachile centuncularis*, Linn. Very common in gardens and at bramble flowers, from June to August
- *versicolor*, Smith. One female in the garden, 1873
- *circumcincta*, Kirby. *Norwich*; June, July
- *willughbiella*, Kirby. *Norwich*; plentiful, June to August
- *maritima*, Kirby. *Mousehold*, *Yarmouth*; not scarce, July and August
- Eucera longicornis*, Linn. *Norwich*, *Postwick*; end of May
- Anthophora retusa*, Linn. *Mousehold*; plentiful, May, or even end of April
- *acervorum*, Fab. Every dry bank; abundant in earliest spring
- *furcata*, Panz. *Eaton*, *Earlham*, *Mousehold*, *Brundall*; frequenting flowers of red nettle, middle of May till August
- Bombus muscorum*, Linn. Very abundant
- *agrorum*, Fab. *Norwich* district
- *venustus*, Smith. Not uncommon
- *elegans*, Seidl. *Mousehold*, *Brundall*, *Yarmouth*, *Cromer*
- *sylvarum*, Linn. Very common
- *derhamellus*, Kirby. Common
- *pratensis*, Linn. Abundant
- *jonellus*, Kirby. *Norwich*; two neuters in 1873

INSECTS

ANTHOPHILA (*continued*)

- Bombus lapidarius*, Linn. } Common every-
— lucorum, Linn. } where
— virginalis, Kirby. }
— hortorum, Linn. }
— latreillellus, Kirby. Generally distri-
buted, but less common
— subterraneus, Linn. Common
Apathus rupestris, Fab. }
— vestialis, Fourc. } Abundant
— barbutellus, Kirby }
— campestris, Panz. Males plentiful, but
females quite scarce
Apis mellifica, Linn. Everywhere

ICHNEUMONIDÆ

- Chasmodon notatorius*, Fab. Very com-
mon
Ichneumon consimilis, Wesm. *Cromer*;
one female, end of May
— lineator, Fab. *Brundall*; two males
— impressor, Zett. *Lynn*, reared by Mr.
Atmore from larvæ of *Gortyna*
flavago
— deraus, Wesm. *Eaton*; one male,
July
— bilineatus, Gmel. A common parasite
of *Abraxas grossulariata*
— molitorius, Linn. *Yarmouth*.
— languidus, Wesm. *Eaton*, *Earlham*;
two males, July, August
— vaginatorius, Linn. Common
— confusorius, Gmel. Males common,
females less so
— tempestivus, Holm. *Mousehold*, *Yar-*
mouth; Mr. Thouless
— gracilentus, Linn. *Earlham*; one
female, August
— luctatorius, Linn. Common
— macrocerus, Thom. *Brundall*; one
male
— labrator, Fab. *Earlham*, *Brundall*,
Cromer
— insidiosus, Wesm. *Brundall*; August
— primatorius, Forst. *Mousehold*; one
female taken by Mr. Thouless
— emancipatus, Wesm. *Norwich*; one
male
— cessator, Müll. *Norfolk*; in June
— gemellus, Gr. *Heigham*, *Earlham*,
Brundall, *Lynn*; not common
— saturatorius, Linn. *Earlham*, *Brundall*,
Lynn
— bimaculatorius, Panz. *Brundall*; one
female, September
— nigrirarius, Gr. *Sparham*; taken by
Mr. F. Norgate
— curvinervis, Holm. *Norwich*
— fugitivus, Gr. *Norwich*; common;
perhaps a variety of *I. fabricator*
— lanius, Gr. *Norwich*; common

ICHNEUMONIDÆ (*continued*)

- Ichneumon heracliana*, Bridg. *Lynn*; has
been reared from *Depressaria hera-*
cliana
— leucomelas, Gmel. *Mousehold*, *Earl-*
ham
— vestigator, Wesm. *Norwich*
— lepidus, Gr. *Brundall*, *Norwich*;
males only
— anator, Fab. *Norwich*; two females
— bilunulatus, Gr. Common
— ochropus, Gmel. *Norwich*
— ridibundus, Gr. *Eaton*; one male,
July
— plagiator, Wesm. *Eaton*
— albicinctus, Gr. Very common
— deceptor, Gr. *Norfolk*
— expectatorius, Panz. *Norfolk*
Amblyteles palliatorius, Gr. *Mousehold*,
Brundall
— amatorius, Forst. *Norwich*
— oratorius, Fab. *Mousehold*; two males
in September
— vadatorius, Rossi. *Norwich*; one
taken by Mr. Thouless
— occisorius, Fab. Common
— negatorius, Fab. *Norfolk*
— castigator, Fab. Common
— messorius, Gr. *Earlham*; two females
— funereus, Fourc. One male, at
Eaton
— alticola, Gr. Common
Trogus lutorius, Fab. *Norwich*, *Lynn*
— alboguttatus, Gr. *Norfolk*; in June
Platylabris rufus, Wesm. *Lynn*; bred by
Mr. Atmore from larvæ of *Cabera*
pusaria
— pedatorius, Fab. Common
— viridipennis, Gr. *Norwich*
— dimidiatus, Gr. *Mousehold*
— pactor, Wesm. *Earlham*
Apæleticus inclytus, Wesm. *Lakenham*,
Earlham
Herpestomus nasutus, Wesm. *Earlham*;
August
— furunculus, Wesm. *Earlham*, *Eaton*,
Mousehold; August, September
— intermedius, Wesm. *Eaton*; August
— striatus, Bridg. *Eaton*, *Earlham*,
Brundall
Colpognathus celerator, Gr. *Lynn*
Dicælotus pumilus, Gr. *Mousehold*; June
— cameroni, Bridge. *Heigham*, *Earlham*;
August
Centeterus opprimator, Gr. *Brundall*;
common
Trachyarus corvinus, Thom. *Earlham*;
July
Phæogenes semivulpinus, Gr. *Norwich*,
Brundall; common

A HISTORY OF NORFOLK

ICHNEUMONIDÆ (continued)

- Phæogenes planifrons, Gr. *Brundall* ; August
 — stimulator, Gr. *Norfolk* ; June
 — calopus, Wesm. Common generally
 — varicolor, Wesm., and var. intermedius. *Gunton* ; August
 — fulvitarisus, Wesm. Common
 — bellicornis, Wesm. *Brundall, Earlbam* ; May, September
 — nanus, Wesm. *Eaton*
 — ischiomelinus, Gr. Common
 — trepidus, Wesm. *Hethersett, Wroxham* ; May
 — impegger, Wesm. *Earlbam* ; August, September
 — argutus, Wesm. *Eaton, Earlbam* ; common
 — collaris, Gr. *Eaton* ; July
 Oiorhinus pallipalpus, Wesm. *Eaton, Earlbam, Mousehold* ; autumn
 Æthecerus longulus, Wesm. *Earlbam* ; August
 — discolor, Wesm. *Earlbam* ; one female in September
 — nitidus, Wesm. *Earlbam, Lakenham, Heigham, Gunton, Lynn* ; reared from larvæ of *Cosmia diffinis*
 — dispar, Wesm. Common
 Ischnus nigricollis, Wesm. *Norwich*
 Epitomus parvus, Thom. *Norwich* ; taken occasionally
 Alomyia debellator, Fab. Male very common ; female rarely seen
 Stilpnus gagates, Gr. *Brundall* ; July
 — pavoniæ, Scop. *Eaton* ; July
 — blandus, Gr. *Norwich* ; June, August
 Phygadeuon caliginosus, Gr. *Sparham*
 — nigrita, Gr. *Earlbam, Eaton* ; September
 — flavimanus, Gr. *Mousehold* ; July
 — dumetorum, Gr. Common, July, August
 — variabilis, Gr. Common in May
 — fumator, Gr. Very common and variable
 — inflatus, Thom. } *Norfolk* ; localities
 — scaposus, Thom. } not recorded
 — dimidiatus, Thom. }
 — troglodytes, Gr. }
 — jejunator, Gr. } Common
 — æreus, Gr. }
 — brevitarsis, Thom. *Earlbam, Wroxham* ; August, September
 — nitidus, Gr. *Earlbam, Eaton, Heigham* ; September
 — ovatus, Gr. *Earlbam* ; August
 — exiguus, Gr. *Norwich*
 — brevis, Gr. *Earlbam* ; August
 — improbus, Gr. *Earlbam* ; September

ICHNEUMONIDÆ (continued)

- Phygadeuon hopei, Gr. *Lakenham* ; September
 — vagabundus, Gr. Common
 — cinctorius, Fab. *Acle* ; a female taken by Mr. Thouless
 — quadrispinus, Gr. *Brundall* ; October
 — graminicola, Gr. *Brundall, Lakenham*
 — abdominator, Gr. *Eaton*
 — jucundus, Gr. Very common
 — arridens, Gr. Common
 — oviventris, Gr. *Earlbam*
 — erythrinus, Gr. *Norwich, Horning, Foxley*
 — brachyurus, Thom. *Earlbam* ; June
 — flavipunctatus, Bridg. *Mousehold* ; October
 — perspicillator, Gr. *Earlbam, Lynn* ; bred by Mr. Atmore from *Trachæa piniperda*
 Phygadeuon rotundipennis, Thom. *Mousehold* ; August
 — nanus, Gr. *Earlbam*
 — sperator, Gr. *Feltborpe*
 — lacteator, Gr. *Earlbam, Brundall* ; July, August
 — hercynicus, Gr. *Eaton, Heigham, Brundall* ; July, August
 — subtilicornis, Gr. *Heigham* ; June
 — parvulus, Gr. *Brundall, Heigham, Lynn*
 Cryptus viduatorius, Fab. *Norwich*
 — lugubris, Gr. *Heigham, Brundall, Horning*
 — tarsoleucus, Schr. } Common
 — moschator, Fab. }
 — parvulus, Gr. *Heigham, Brundall*
 — anatorius, Gr. *Mousehold* ; August
 — stomaticus, Gr. *Eaton, Earlbam* ; June
 — titillator, Gr. *Eaton* ; June
 — dianæ, Gr. *Lynn*
 — obscurus, Gr. Generally common
 — hostilis, Gr. *Earlbam* ; July, September
 — porrectorius, Fab. *Eaton* ; July, September
 — analis, Gr. Generally common
 — peregrinator, Linn. *Norwich, Brundall, Cromer* ; June, August
 — ornatus, Gr. *Eaton, Brundall* ; May, August
 — amænus, Gr. *Norwich*
 — migrator, Fab. Generally common
 — cimbicis, Tsch. *Norwich* ; reared from larva of *Trichiosoma betuleti*
 — pygoleucus, Gr. Generally common
 — carnifex, Gr. *Brundall* ; July, September
 — elegans, Desv. *Brundall* ; July, October

INSECTS

ICHNEUMONIDÆ (continued)

- Cryptus antennatus*, Bridg. *Eaton*; two females only; April
 — *incurbitor*, Stroem. *Norwich*; reared from larva of *Saturnia carpini*
 — *signatorius*, Fab. *Norwich*; reared from perforated bramble sticks
Mesostenus obnoxius, Gr. *Brundall*; parasitic on *Zygæna filipendulæ*
Nematopodius ater, Brisch. *Norwich*; males only taken
Hemiteles biannulatus, Gr. *Brundall*; May
 — *subannulatus*, Bridg. *Earlham*; September
 — *hadrocera*, Thom. *Earlham*; July
 — *fulvipes*, Gr. Common generally; bred from both moth and bee larvæ
 — *submarginatus*, Bridg. *Mousehold*; reared from cocoons of *Apanteles congestus*
 — *rufipes*, Bridg. *Earlham*; June
 — *areator*, Panz. Generally common; parasitic on moth and saw-fly larvæ
 — *bicolorinus*, Gr. } Generally common
 — *æstivalis*, Gr. }
 — *cingulator*, Gr. }
 — *aberrans*, Gr. *Brundall*; one male in June
 — *chionops*, Gr. *Earlham, Eaton*; May, August, September
 — *sordipes*, Gr. *Aylsham*; has been reared from galls of *Cynips kollari*
 — *similis*, Gr. Generally common.
 — *obscurus*, Bridg. *Eaton*; two reared from spiders' eggs
 — *tibialis*, Bridg. *Earlham*; September
 — *conformis*, Gr. *Lynn*; reared by Mr. Atmore from larvæ of *Lithocolletis frolichella*
 — *scabriculus*, Thom. *Eaton*; July
 — *castaneus*, Tasch. *Earlham*; July; parasitic on *Trichiosoma betuleti*
 — *inimicus*, Gr. *Eaton, Earlham*
 — *pictipes*, Gr. *Earlham*; July
 — *furcatus*, Tasch. Frequent; has been reared from larvæ of *Gracilaridæ*
 — *oxyphinus*, Gr. *Earlham*; September
 — *incisus*, Bridg. *Earlham, Heigham*; July, September
 — *balteanus*, Thom. *Norwich*; August
 — *varicoxis*, Tasch. *Earlham*; July
 — *imbecillis*, Thom. *Norwich, Brundall*; generally common
 — *floricolator*, Gr. *Earlham, Lakenham*
 — *stagnalis*, Thom. *Norwich, Brundall*; reared from spiders' eggs
 — *fragilis*, Gr. Generally distributed; reared from spiders' eggs

ICHNEUMONIDÆ (continued)

- Hemiteles ruficaudatus*, Bridg. *Wroxham, Earlham*; July
 — *gyrini*, Parf. *Brundall*; May
 — *formosus*, Gr. *Earlham*; June, July
 — *gracilis*, Thom. *Norwich, Brundall*; parasitic on spiders' eggs
 — *validicornis*, Thom. *Eaton*; September
 — *mixtus*, Bridg. *Brundall*
Orthopelma luteolator, Gr. Common; reared from rose gall-flies = *Rhodites elegantriæ*
Catoglyptus mangeri, Gr. *Brundall, Horning*; rare; June, September
Agrothereutes abbreviator, Fab. *Mousehold*; one female in August
 — *hopei*, Gr. Common; parasitic on Micro-lepidoptera
Aptesis nigrocincta, Pz. *Eaton, Mousehold*
Hemimachus piceus, Bridg. *Mousehold*; August
 — *rufipes*, Bridg. *Norwich*; July
 — *ovatus*, Bridg. *Brundall*; September
 — *rufotinctus*, Bridg. *Felthorpe*; June
Pezomachus tener, Fst. *Norwich*; common
 — *zonatus*, Fab. Common; reared from eggs of a spider, *Agelena brunnea*
 — *timidus*, Fst. *Norwich*; one female
 — *nigritus*, Fst. *Earlham, Eaton, Brundall*
 — *spinula*, Thom. *Norwich*; one male
 — *posthumus*, Fst. *Mousehold*
 — *costatus*, Bridg. *Norwich*; common
 — *rufulus*, Fst. Generally common
 — *corruptor*, Fst. Common; reared by Mr. Thouless from larva of *Cionus scrophulariæ*
 — *ochraceus*, Fst. Generally common
 — *mandibularis*, Thom. *Norwich*; one male in September
 — *distinctus*, Fst. *Mousehold*
 — *intermedius*, Fst. *Norwich*; common
 — *mülleri*, Fst. *Mousehold*
 — *incertus*, Fst. } *Norwich*; common
 — *faunus*, Fst. }
 — *juvenilis*, Fst. *Eaton*
 — *xylochophilus*, Fst. *Brundall, Horning*
 — *analys*, Fst. Generally common
 — *agilis*, Fst. *Norwich*; one male
 — *viduus*, Fst. *Norwich*; three females
 — *hortensis*, Gr. *Brundall*; one male
 — *transfuga*, Fst. Common; reared from eggs of a spider, *Agelena labyrinthica*
 — *rufocinctus*, Gr. Common; parasitic upon moths of the family *Tineina*
 — *detritus*, Fst. *Mousehold*; females reared from larvæ of *Apanteles congestus*

A HISTORY OF NORFOLK

ICHNEUMONIDÆ (continued)

- Pezomachus vagans*, Gr. *Buckenham*; parasitic on spiders' eggs
 — *tonsus*, Fst. *Mousehold*; females reared from larvæ of *Apanteles congestus*
 — *fasciatus*, Gr. Common; parasitic on bees as well as on spiders' eggs
 — *impotens*, Fst. *Earlham*; one female in July
 — *insolens*, Fst. *Lynn*; parasitic upon *Micro-Lepidoptera*
 — *avidus*, Fst. *Norwich*; one male
 — *anguinus*, Fst. *Norwich*
Eniscospilus merdarius, Gr. *Norwich*; reared from larvæ of *Trachea pini-perda*
 — *ramidulus*, Linn. *Heigham Osier Car*
Ophion obscurum, Fab. *Sparham*
 — *luteum*, Linn. Generally common
 — *minutum*, Brisch. *Norwich*
 — *distans*, Thom. *Norfolk*
Anomalon xanthopus, Schr. *Lynn*; reared by Mr. Atmore from *Trachea pini-perda*
 — *cerinops*, Gr. *Brundall, Sparham*
 — *clandestinum*, Gr. *Lynn*; reared by Mr. Atmore from *Eupithecia valerianata*
 — *perspicuum*, Wesm. *Lynn*; parasitic on *Noctuæ* and *Geometræ*
 — *anomelas*, Gr. *Lynn*; reared from *Retinia turionella* by Mr. Atmore
 — *procerum*, Gr. *Lynn*
Agrypon flaveolatum, Gr. *Lynn*; parasitic on *Noctuæ*
 — *tenuicorne*, Gr. *Lynn*; parasitic on *Micro-lepidoptera*
 — *canaliculatum*, Retz. *Lynn*; indiscriminately parasitic on *Lepidoptera*
Trichomma enicator, Rossi. *Lynn*; reared from larvæ of *Tortrices*
Opheltes glaucopterus, Linn. *Brundall*; one female
Paniscus cephalotes, Holm. *Norfolk*
 — *ocellaris*, Thom. *Norfolk*
 — *testaceus*, Gr. Generally common
Parabatus virgatus, Gr. *Foxley*
 — *tarsatus*, Brisch. *Lynn*; reared by Mr. Atmore from *Eupithecia* larvæ
 — *nigricarpus*, Thom. *Lynn*
Campoplex falcator, Thunb. *Sparham*; reared from larvæ of *Pygæa bucephala*
 — *augustatus*, Thom. *Lynn*; from larva of *Cabera pusaria*
 — *facialis*, Holm. *Norwich*
 — *bucculentus*, Holm. *Cromer*; August
 — *xenocampus*, Fst. *Drayton*
 — *terebrator*, Fst. *Earlham*; May

ICHNEUMONIDÆ (continued)

- Campoplex leptogaster*, Holm. *Eaton*; May
 — *anceps*, Holm. *Norwich*; August; parasitic on *Pelurga comitata*
 — *disclusus*, Fst. *Earlham*; September
 — *erythrogaster*, Fst. Generally abundant
 — *confusus*, Fst. *Norwich*
 — *zonellus*, Fst. *Lynn*; reared from larvæ of *Eupithecia pulchellata*
 — *tenuis*, Fst. *Eaton, Earlham*; July
 — *subolcita*, Fst. *Felthorpe*; June
Cymodusa leucocera, Holm. *Mousehold, Eaton*; October
Thymaris fasciata, Bridg. *Norwich*; a single specimen; very rare
Sagaritis erythropus, Thom. *Brundall*; May, July
 — *zonata*, Gr. Generally common
 — *annulipes*, Tsch. *Brundall*; June
 — *brachycera*, Thom. } *Earlham*; July
 — *agilis*, Holm. }
 — *macrocera*, Thom. *Eaton*; August
 — *fasciatus*, Bridg. *Horning*; June
Casinaria orbitalis, Gr. *Brundall, Sparham*
Limneria aberrans, Gr. *Earlham*; one male, June
 — *albida*, Gmel. Generally common; reared from larvæ of *Eupithecia ab-synthiata*
 — *apostata*, Gr. *Lynn*; reared from *Depressaria assimilella*
 — *argentata*, Gr. *Earlham*; August
 — *armillata*, Gr. *Norwich*; common
 — *barrettii*, Bridg. *Earlham*; July, August
 — *bicingularata*, Gr. *Earlham*; August
 — *brischkei*, Bridg. Generally common
 — *carnifex*, Gr. *Mousehold*
 — *chrysosticta*, Gr. *Earlham*; July
 — *consobrina*, Holm. *Eaton*; July
 — *concinna*, Holm. *Norwich*; August
 — *coxalis*, Bris. *Lynn*; very rare
 — *crassicornis*, Gr. *Earlham*
 — *crassiuscula*, Gr. *Earlham*
 — *cursitans*, Holm. Generally common; August, September
 — *cylindrica*, Bris. *Brundall*
 — *dispar*, Gr. *Earlham*; September
 — *dolosa*, Gr. *Norwich, Brundall*; reared from a larvæ of *Gastropacha quercifolia*
 — *dorsalis*, Gr. *Norwich, Horning*; June, August
 — *elishæ*, Bridg. *Mousehold, Earlham*; parasitic on *Micro-lepidoptera*
 — *ensator*, Gr. Generally common; parasitic on *Tortrices* and *Tineina*
 — *erythropyga*, Holm. *Norwich, Brundall*; June, July

INSECTS

ICHNEUMONIDÆ (continued)

- Limneria erucator*, Holm. *Brundall*
 — *exareolata*, Retz. *Earlham*
 — *faunus*, Gr. Generally very common
 — *femoralis*, Gr. *Norwich*; parasitic on small Micro-Lepidoptera
 — *fenestralis*, Holm. *Mousehold*
 — *fulviventris*, Gmel. *Norwich*; May, June
 — *geniculata*, Gr. *Lynn*
 — *hydropota*, Holm. *Brundall*; July
 — *gracilis*, Gr. *Mousehold*, *Earlham*
 — *interrupta*, Holm. Generally common
 — *kreichbaumeri*, Bridg. *Brundall*; parasitic on *Tæniocampa instabilis*
 — *latungula*, Thom. *Brundall*; July
 — *longipes*, Müll. *Norwich*, *Lynn*; July
 — *lugubrina*, Holm. *Earlham*; June
 — *majalis*, Gr. Generally abundant
 — *molesta*, Gr. *Lynn*
 — *mutabilis*, Holm. *Norwich*; common
 — *notata*, Gr. *Norwich*, *Harford Bridges*; July
 — *pagana*, Holm. *Earlham*; June
 — *paludicola*, Gr. *Felthorpe*; June
 — *ruficincta*, Gr. *Brundall*, *Earlham*, *Aylsham*
 — *ramidula*, Bris. *Lynn*; reared from larvæ of *Retinia pinivorana*
 — *reticulata*, Bridg. *Brundall*, *Sparham*; June, July
 — *rufiventris*, Gr. *Norwich*, *Eaton*, *Brundall*; July, August
 — *robusta*, Woldst. *Earlham*, *Lynn*
 — *tibialis*, Gr. *Norwich*; reared from larvæ of *Coleophora lineola*
 — *tumidula*, Gr. *Aylsham*; one specimen
 — *vestigialis*, Retz. Generally distributed; reared from willow galls = *Nematus gallicola*
 — *virginalis*, Gr. *Norwich* district
Canidia pusilla, Retz. *Earlham*; July
 — *trochantella*, Thom. *Earlham*; October
 — *exigua*, Gr. *Brundall*, *Gunton*; July
 — *subcincta*, Holm. *Eaton*; July
Nemeritis macrocentra, Gr. *Lynn*; reared from larvæ of *Ptycholoma lecheana*
Meloboris gracilis, Holm. *Brundall*
Cremastus interruptor, Gr. *Yarmouth*
Atractodes vestalis, Hal. Generally common
 — *gilvipes*, Holm. *Lakenham*; May
 — *exilis*, Hal. } *Norwich*; May, July
 — *bicolor*, Gr. }
 — *properator*, Hal. Generally common
 — *splendens*, Gr. *Brundall*; July
 — *compressus*, Thom. *Wroxham*; June
Exolytus lævigatus, Gr. Generally common; a very variable species

ICHNEUMONIDÆ (continued)

- Mesochorus tenuicornis*, Thom. *Lakenham*; August
 — *politus*, Gr. *Eaton*; July
 — *nigripes*, Retz. *Lakenham*; June
 — *pectinipes*, Bridg. *Earlham*; May
 — *vitticollis*, Holm. *Eaton*, *Wroxham*; June
 — *testaceus*, Gr. *Brundall*; May
 — *sylvarum*, Hal. Generally common; July, August
 — *crassimanus*, Holm. *Eaton*; August
 — *vittator*, Zett. *Lynn*; common, reared from larvæ of *Nola cucullatella*
 — *tenuiscapus*, Thom. *Brundall*; May
 — *stigmaticus*, Thom. *Earlham*, *Sparham*
 — *pictoralis*, Retz. *Mousehold*, *Earlham*; reared from larvæ of *Apanteles*
 — *tachypus*, Holm. *Norwich*, *Salhouse*
 — *confusus*, Holm. Generally common
 — *convexicollis*, Thom. *Norwich*
Aperileptus albipalpus, Gr. *Earlham*; July
Plectiscus spilotus, Fst. *Eaton*; May, June
 — *eury stigma*, Thom. *Earlham*; September
 — *melanocerus*, Fst. *Buckenham*
Idioxenus erythrostomus, Gr. *Aylsham*; May
 — *mediator*, Schio. *Brundall*; July
Proclitus grandis, Fst. *Earlham*; September
Eusterinx obscurella, Fst. *Earlham*; May
Porizon hostilis, Gr. *Brundall*; one female
 — *harpurus*, Schr. *Eaton*
Thersilochus carinatus, Bridg. *Lakenham*; July
 — *jocator*, Fab. Generally common
 — *rufipes*, Holm. *Earlham*; end of August, September
 — *triangularis*, Gr. *Norwich*, *Hethersett*; May, June
 — *versatus*, Holm. *Earlham*; August, September
 — *moderator*, Linn. *Norwich*; May, June
 — *flavicornis*, Thom. *Eaton*; reared from galls of *Nematus gallicola*
 — *morionellus*, Holm. *Brundall*; June
Collyria calcitrator, Vill. Generally common
Exetastes osculatoria, Fab. *Earlham*; June, July
 — *calobatus*, Gr. *Earlham*; September
 — *illusor*, Gr. *Harford Bridges*; July
 — *albitarsus*, Gr. *Norwich*; common
 — *guttatorius*, Gr. *Mousehold*
Banchus falcator, Fab. *Norwich*
Scolobates auriculatus, Fab. *Brundall*; one specimen, June

A HISTORY OF NORFOLK

ICHNEUMONIDÆ (continued)

- Mesoleptus testaceus*, Fab. *Norwich*
 — *cingulatus*, Gr. } Generally common
 — *typhæ*, Gr. }
 — *fregax*, Gr. *Norwich, Felthorpe*
 — *marginatus*, Bridg. *Brundall*; May
 — *macroductylus*, Holm. *Horning*; June
 — *sulphuratus*, Gr. *Brundall*; August
Catoglyptus fortipes, Gr. *Norwich, Brundall*; June
 — *fusicornis*, Gmel. *Lynn*; June
Rhæstus bipunctatus, Bridg. *Earlham*; May
Euryproctus nigriceps, Gr. *Norwich*; reared from cocoons of *Trichiosoma betuleti*
 — *sinister*, Bris. *Earlham*; September
 — *minutus*, Bridg. *Brundall*; May
 — *atomator*, Müll. *Norwich, Brundall, Buckenham*; June, October
 — *geniculosus*, Gr. *Norwich, Brundall*; July, August
 — *albopictus*, Gr. *Brundall*; July, August
Prionopoda stictica, Fab. *Mousehold*; July
 — *glaber*, Bridg. *Norwich*; July
Perillissus filicornis, Gr. Generally very common
 — *variator*, Müll. } Usually common
 — *vernalis*, Gr. }
 — *subcinctus*, Gr. } Generally very common
 — *limitaris*, Gr. }
 — *pictilis*, Holm. *Norwich*
 — *gorskii*, Retz. *Norwich, Lynn*; July
 — *pallidus*, Gr. *Brundall, Horning*; June, July
 — *scotopterus*, Gr. *Earlham*; June
 — *bucculentus*, Holm. *Lynn*; June
Eclytus ornatus, Holm. *Earlham*; Sept.
 — *fontinalis*, Holm. *Mousehold*; on heath
Mesoleius sanguinicollis, Gr. *Brundall, Cromer*
 — *hæmatodes*, Gr. }
 — *furax*, Holm. } *Norwich*
 — *aulicus*, Gr. }
 — *dubius*, Holm. }
 — *caninæ*, Bridg. *Norwich*; reared from larvæ of *Eriocampa limacina*
 — *vigens*, Holm. *Earlham*; August
 — *parvus*, Holm. *Earlham*; August, one specimen
 — *filicornis*, Holm. *Eaton, Mousehold, Brundall*
 — *transfuga*, Holm. *Lynn*
 — *virgulatorum*, Gr. *Eaton*; June, July
 — *multicolor*, Gr. *Norwich*
 — *unifasciatus*, Holm. *Earlham*
 — *dorsalis*, Gr. *Earlham*; one female
 — *rufinotatus*, Holm. *Earlham*
 — *difformis*, Holm. *Norwich, Salhouse*

ICHNEUMONIDÆ (continued)

- Mesoleius pedatus*, Bridg. *Brundall*; one female, September
 — *ignavus*, Holm. } *Norwich*
 — *leptogaster*, Holm. }
 — *calcaratus*, Bridg. *Norwich, Brundall*
 — *erythrogaster*, Holm. *Brundall*; one male
 — *armillatorius*, Gr. *Brundall*
 — *ruflabris*, Zett. Generally common
 — *hamulus*, Gr. *Norwich, Lynn*
 — *semicaligatus*, Gr. } Generally common
 — *insolens*, Gr. }
 — *testaceus*, Fab. *Norwich*
Saotus compressiusculus, Thom. *Eaton*; June
Trematopygus atratus, Holm. *Lynn*; reared from *Croesus varians*
 — *procurator*, Gr. *Buckenham Ferry*
Dyspetus prærogator, Gr. Generally common in autumn
Otoblastus luteomarginatus, Gr. *Norwich*
Tryphon elongator, Fab. *Norwich*; common
 — *rutilator*, Linn. Generally common
 — *trochanteratus*, Holm. Generally common
 — *vulgaris*, Holm. *Norwich*
 — *signator*, Gr. Generally common
 — *ephippium*, Holm. *Lakenham, Eaton*
 — *bicornutus*, Holm. *Cringford, Brundall, Felthorpe*; July, August
 — *confinis*, Holm. *Brundall*; September
 — *mitigosus*, Gr. *Earlham*
 — *albipes*, Gr. *Earlham*; July
Grypocentrus bipunctatus, Bridg. *Earlham*; June
 — *albipes*, Ruthe. *Lakenham, Earlham*; reared from *Fenusa pumilio*
 — *anomalus*, Bris. *Earlham, Brundall*
Lathrolestes unguis, Thom. *Norwich*
 — *marginatus*, Thom. *Mousehold*
Rhæstus lativentris, Holm. } *Earlham*
Adelognathus chrysopygus, Gr. }
Monoblastus lævigatus, Holm. *Norfolk*
 — *neustriæ*, Retz. *Brundall*
 — *caproni*, Bridg. *Earlham*
Polyblastus varitarsus, Gr. Generally common
 — *stenhammari*, Holm. *Lynn*
 — *pastoralis*, Gr. } *Brundall*
 — *marginatus*, Holm. }
 — *carinatus*, Holm. *Earlham*
 — *pinguis*, Gr. Generally common
Erromenus brunnicans, Gr. *Earlham*
 — *frenator*, Gr. *Brundall, Eaton, Poringland*
Acrotomus lucidulus, Gr. } *Lynn*
Cteniscus erosus, Holm. }
 — *litoratorius*, Linn. *Earlham*

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ICHNEUMONIDÆ (continued)

- Cteniscus sexcinctus, Gr. Generally common
 — triangulatorius, Gr. *Lynn*
 — apiarius, Gr. *Bawsey Heath, Lynn*
 — pictus, Gr. *Norwich, Lynn*
 — bimaculatus, Holm. } *Brundall*
 — limbatus, Holm. }
 — limbatellus, Holm. *Eaton, Brundall*
 — dahlbomi, Holm. *Horning*
 — hostilis, Holm. *Lakenham*
 Exyston cingulum, Gr. Generally distributed
 Sphecophaga vesparum, Curt. *Norwich*.
 Parasitic on *Vespa vulgaris*
 Calptrochia elegantula, Sch. Generally distributed
 Triclistus holmgreni, Bohn. *Lynn*; reared from larvæ of *Tortrix decretana* by Mr. Atmore
 — nitifrons, Thom. *Mousehold, Bawsey Heath, Lynn*
 — pubiventris, Thom. *Earlham*
 — podagricus, Gr. *Lynn*
 — globulipes, Desv. *Lynn*; reared from larvæ of *Pædisca semifuscana*
 — niger, Bridg. *Earlham*
 Metacoelus mansueter, Gr. *Norwich*
 Exochus nigripalpus, Thom. Generally common
 — flavomarginatus, Holm. *Norwich, Brundall, Lynn*
 — consimilis, Holm. *Lynn*
 — tibialis, Holm. *Mousehold, Earlham, Brundall*
 — woldstedti, Holm. *Earlham*
 — albicinctus, Holm. *Felthorpe*
 Chorinæus cristator, Gr. Generally distributed; parasitic on Tortricæ
 — funebris, Gr. } Generally common
 — talpa, Hal. }
 — flavipes, Bridg. *Mousehold*; one specimen in August, 1872
 Orthocentrus anomalus, Gr. *Eaton, Earlham*
 — affinis, Zett. Generally common
 — longicornis, Holm. *Brundall, Earlham*; two males
 — flavipes, Gr. *Mousehold*; on heath, July
 Bassus lætatorius, Fab. Generally common
 — varicoxa, Thom. *Mousehold*
 — nemoralis, Holm. Generally common
 — annulatus, Gr. *Mousehold*
 — bizonarius, Gr. *Buckenham Ferry, August*
 — lateralis, Gr. *Brundall, Lynn*
 — cinctus, Gr. *Eaton*
 — exultans, Gr. *Norwich, Lakenham, Mousehold*

ICHNEUMONIDÆ (continued)

- Bassus pictus, Gr. *Norwich*; common
 — pumilus, Thom. *Eaton*
 — strigator, Gr. Generally common
 — nigritarsus, Gr. *Mousehold, Eaton, Brundall*
 — areolatus, Holm. *Heigham, Brundall, Buckenham Ferry*
 — pulchellus, Holm. } Generally common
 — cognatus, Holm. }
 — dorsalis, Holm. *Norwich, Mousehold, Brundall*
 — signatus, Gr. *Brundall, Eaton, Mousehold*
 — festivus, Fab. *Cringleford*
 — hygrobius, Thom. *Brundall*
 — obscuripes, Holm. *Earlham, Buckenham Ferry*
 — elegans, Gr. *Brundall*
 — holmgreni, Bridg. *Brundall, Felthorpe*
 — insignis, Gr. *Earlham, Buckenham Ferry, Lynn*
 — pulcher, Holm. *Lakenham, Earlham, Brundall*
 — ornatus, Gr. *Bawsey Heath, Lynn*
 Metopius migratorius, Fab. *Yarmouth, Brundall*; one specimen
 Rhyssa persuasoria, Linn. *Norwich, Sparham*
 Ephialtes imperator, Krei. *Norwich*.
 Reared from *Saperda populnea*
 — tuberculatus, Fourc. *Norwich*. Reared from *Saperda populnea*
 Perithous mediator, Fab. }
 — divinator, Rossi. } *Norwich*
 Pimpla examiner, Fab. }
 — turionellæ, Linn. Generally common; parasitic on Tortrix larvæ
 — rufata, Gmel. *Norfolk*
 — flavonotata, Holm. *Norwich, Brundall*
 — scanica, Vill. } Generally common
 — instigator, Fab. }
 — opacellata, Desv. *Norwich*
 — oculatoria, Fab. *Earlham*
 — graminellæ, Schr. Generally common; reared from larvæ of *Plusia festuæ*
 — didyma, Gr. Generally common
 — stercorator, Fab. *Earlham*
 — brevicornis, Gr. Generally common
 — similis, Bridg. *Earlham, Brundall*
 — sagax, Retz. *Lynn*; reared from larvæ of *Retinia turionella* by Mr. Atmore
 — detrita, Holm. Generally common
 — pomorum, Retz. *Drayton*
 — roborator, Fab. *Norwich*
 — diluta, Retz. *Brundall, Lynn*
 — punctiventris, Thom. *Mousehold*; parasitic on Micro-lepidoptera
 Polysphincta varipes, Gr. *Brundall*; May
 — subrufa, Bridg. *Lynn*

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ICHNEUMONIDÆ (continued)

- Acrodactyla degener*, Hal. *Norwich, Brundall*
Clistopyga incitator, Fab. *Norwich*
 — *rufata*, Holm. *Brundall*; only one female
Glypta monoceros, Gr. *Brundall*
 — *ceratites*, Gr. Generally common; reared from larvæ of *Phycis betulæ* by Mr. Atmore
 — *vulnerator*, Gr. *Mousehold, Lynn*; reared from larvæ of *Catoptria scopioliana* by Mr. Atmore
 — *hesitator*, Gr. *Mousehold, Lynn*
 — *teres*, Gr. *Norwich*
 — *mensurator*, Fab. *Eaton*
 — *incisa*, Gr. *Earlham, Lynn*; reared from larvæ of *Penthina picana* by Mr. Atmore
 — *bifoveolata*, Gr. Generally common
 — *resinanæ*, Retz. *Lynn*; reared from larvæ of *Retinia turionella*
 — *flavolineata*, Gr. *Eaton, Brundall*
 — *flavipes*, Desv. *Lynn*; parasitic on larvæ of *Tortrices*
 — *trochanterata*, Bridg. *Mousehold*; about heath, June
 — *pictipes*, Tasch. *Earlham, Lynn*
 — *genalis*, Möll. *Lynn*; reared by Mr. Atmore from larvæ of various *Tortrices*
Lycorina triangulifera, Holm. *Lynn*, one male taken in May, 1887, by Mr. Atmore; very rare
Schizopyga circulator, Panz. Not uncommon
Lampronota nigra, Gr. *Bawsey Heath, Lynn*
 — *caligata*, Gr. *Lynn, Earlham*

ICHNEUMONIDÆ (continued)

- Lissonota variabilis*, Gr. *Lynn*; reared from larvæ of *Penthina picana*
 — *parallela*, Gr. *Earlham*
 — *bellator*, Gr. Generally very common
 — *commixa*, Holm. Generally distributed
 — *cylindrator*, Vill. Common everywhere
 — *insignita*, Gr. *Eaton*
 — *sulphurifera*, Gr. Generally common
 — *femorata*, Holm. *Earlham, Brundall*
 — *linearis*, Gr. *Mousehold*
 — *leptogaster*, Holm. *Norwich, Strumpshaw*; common in autumn
 — *carbonaria*, Holm. *Lynn*; reared from *Retinia turionella*
 — *transversa*, Bridg. *Earlham*
 — *unicincta*, Holm. *Brundall, Eaton, Earlham*
 — *errabunda*, Holm. *Brundall*
 — *vicina*, Holm. *Earlham*
 — *dubia*, Holm. *Lynn*
Meniscus setosus, Fourc. *Sparham*
 — *agnatus*, Gr. *Earlham*
 — *impressor*, Gr. Generally common
 — *suborbitalis*, Gr. *Brundall, Mousehold*
Phytodietus segmentator, Gr. *Norwich, Lynn, Wroxham*
 — *coryphæus*, Gr. } Generally common
 — *obscurus*, Desv. }
Cryptopimpla blanda, Gr. *Earlham, Buckenham Ferry*
Œdimopsis scabriculus, Gr. Moderately common
Stilbops vetula, Gr. *Earlham*; May
Zygonomus pilicornis, Gr. *Earlham*
 — *securicornis*, Holm. *Earlham*
Apanteles stauropodis, Marshall. *Norwich*; reared from a larva of *Stauropus fagi*

COLEOPTERA

Notwithstanding the fact that some eighteen hundred different kinds of beetles are known to occur in this county, not one per cent. of that number are at all likely to attract the attention of the non-entomological observer. In the house, *Blaps mucronata*, a dull black insect about an inch long, of slow movement and unpleasant odour, with its body drawn out into a short point behind, shares with the cockroaches (*Blattidæ*) the name of 'black-beetle.' The 'ladybirds' (*Coccinellidæ*), of which we have fifteen different kinds in Norfolk, are deserving of mention from the fact that they are largely instrumental in counteracting the ill effects to vegetation arising from the extraordinary fecundity of the plant-lice (*Aphides*); in their larval as well as their adult state they feed upon the latter insects, and as they are generally found in the largest numbers where the supply of food is greatest, they not

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unfrequently get the blame for the blighted appearance of the aphid-infested trees on which they occur. Though of comparatively small size, they are for the most part brightly coloured. The red kinds with two or seven black spots (*Coccinella bipunctata* and *C. septempunctata*) are probably the most familiar, though *Coccinella 22-punctata*, of a bright lemon colour with about twenty-two roundish black spots, is one of the most elegant; it may be found on nettles by almost any roadside. There are probably few asparagus beds where the asparagus-beetle (*Crioceris asparagi*) is not to be found, both in the larval and perfect states, during the summer and autumn; but though this beetle is usually classed amongst the 'insect pests,' it may be doubted whether its presence has any deleterious effect on the crop, except in those cases where circumstances arise which favour its development to an abnormal extent. Though the asparagus-beetle is only about a quarter of an inch long, it is very effectively coloured; the head, antennæ and legs are blackish green, the thorax is red, the wing-cases are pale yellow with a very dark blue marking in the shape of a cross, and the whole insect shines as though it had a coat of varnish.

The rose-beetle (*Cetonia aurata*), a broad rather flat insect about three-fourths of an inch long, of a beautiful metallic green colour with a few irregular transverse wavy whitish lines on the hind part of the wing-cases, is usually accounted a common insect, and such it undoubtedly was in this county some five-and-twenty years since, when it was to be found abundantly on various kinds of showy flowers, particularly roses and white lilies, and four or five at a time might be taken from a single head of flowers of the mountain-ash in suburban gardens around Norwich. It is however now many years since the writer saw a living example of this fine species. One of the beetles most familiar to the ordinary observer of Nature is the 'dor-beetle,' 'dumbledor,' or 'clock' (*Geotrupes stercorarius*), a plump shining black insect about an inch in length, often found flying about roadways at dusk with a loud humming noise. When in full flight its steering powers appear to be defective, as it not unfrequently comes into collision with pedestrians; and, when the point of contact is the face, a stinging blow is the result. On the underside the black colour of the insect is relieved by metallic reflections of blue, purple, and green. When taken in the hand and forcibly detained the dor-beetle endeavours to bring about its release either by feigning death, in which case it stretches out its legs to their utmost extent in the most awkward and unnatural positions and then remains absolutely motionless for some time, or it sets up a feeble squeak, standing still and moving the hind part of its body up and down. The mechanism by means of which it produces this noise is worthy of notice. On that side of the basal joint of the hind leg which lies nearest to the body is a conspicuous oblique ridge, the surface of which bears a number of exceedingly fine transverse ridges, thus forming a sort of file, whilst the hinder edge of the cavity in which the joint works bears a fine smooth ridge; the friction between the latter and the file when the hind

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part of the body is moved a little up and down produces the squeak. This kind of file and scraper arrangement is not uncommon amongst beetles, but there is considerable diversity in the situation of the apparatus and the organs involved. The common oil-beetle (*Meloe proscarabæus*), a large heavy blue black insect with oval pointed wing-cases which overlap at the base, is so-called from the power which it possesses of exuding a clear yellow fluid from its joints when handled. On this account, although it is common enough in grassy places in the spring and early summer, it is by no means a prepossessing object. Its claim on our attention is due to its wonderful metamorphoses, the latter having been for the most part well ascertained. The female deposits an immense number of minute yellow eggs, in from two to four batches. These eggs are glued together and deposited in small holes in the ground, dug by the parent beetle. After an interval of from three to six weeks the young larvæ hatch out ; they are extremely small elongate orange yellow insects with the body nearly parallel in front and much narrowed behind, the tail bearing four very long hairs, two on each side ; the legs are very long and terminate in a single claw, on each side of which there is a slender hook-like process, so that the end of the legs appears to be split into three parts (hence the name *triungulin* which has been applied to this first form of the larva) ; this contrivance enables the little larvæ to cling very tightly to any object. They appear to remain dormant for some time, but under the influence of sufficient warmth exhibit great activity in running over low plants, chiefly those of the Natural Order *Ranunculaceæ*. From these they attach themselves to the hairy clothing of bees and other insects which visit the flowers. Such of the larvæ as happen to attach themselves to bees of the genus *Anthophora* are carried by the latter to their nests, where the larva, in the course of a period during which it devours the eggs of the bee and the food stored up by the latter for its own young, changes its form at least three times before it becomes an ordinary beetle pupa from which the perfect oil-beetle emerges. It will be seen that only a very small proportion of the offspring of the oil-beetle can possibly reach maturity ; and on this point Dr. Sharp says (*Cambridge Natural History*, vol. vi. p. 274) : ‘It is no wonder that the female *Meloe* produces 5,000 times more eggs than are necessary to continue the species without diminution in the number of its individuals, for the first and most important act in the complex series of this life-history is accomplished by an extremely indiscriminating instinct. The newly-hatched *Meloe* has to get on to the body of the female of one species of bee ; but it has no discrimination whatever of the kind of object it requires, and as a matter of fact passes with surprising rapidity on to any hairy object that touches it ; hence an enormous majority of the young are wasted by getting on to all sorts of other insects. These larvæ have been found in numbers on hairy *Coleoptera* as well as on flies and bees of wrong kinds. The writer has ascertained by experiment that a camel’s-hair brush is as eagerly seized, and passed on to, by the young *Meloe* as a living insect is.’ The oil-beetle cannot fly, and its

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occurrence in situations apparently far away from any colony of the wild bees at whose expense it has passed its early stages, is not easily accounted for.

Turning now to the water-beetles, we shall find the whirligig beetles (*Gyrinidæ*) conspicuous by reason of their numbers, and interesting on account of their structure. These insects are known to all from their habit of floating lightly on the surface of the water, and performing graceful complex curves round one another, apparently without colliding. They are admirably constructed for a mode of life which is comparatively rare in the insect world. They have four eyes, one pair on the upper surface and another on the lower, and very short antennæ which can be packed away in the space between the upper and lower pairs of eyes on each side of the head. They are able to dive to escape danger, and then carry with them a small supply of air under the wing-cases, from which a portion of it protrudes as a bright silvery bubble, but they do not stay long beneath the surface. When handled they exude a milky-white fluid which has a very disagreeable smell. Their two hind pairs of legs are beautifully modified so as to serve as paddles, expanding when moved in a backward direction and collapsing into an extremely small space directly the resistance they meet with is in the other direction. The construction of their fore feet is very peculiar. In other water-beetles the soles of the fore feet are directed downwards, but in the whirligigs the fore legs are so set on that the soles of the fore feet are not turned downwards, but towards one another, and the assemblage of suckers which constitutes the prehensile apparatus proper to the soles of the fore feet in the males of water-beetles is in these carried on what is really the side of the fore foot and not the sole. As might be expected from its physical features, Norfolk is especially rich in *Gyrinidæ*, nine out of the eleven kinds known as British having already been found there. Some of the species congregate in immense numbers in the open water near the banks of rivers, whilst others perform their gyrations in the shelter of the stems of water-plants, and are rarely seen except by entomologists in search of them. In some kinds, as *Gyrinus elongatus*, found in ditches near the coast, and *G. bicolor*, a denizen of Hickling Broad, a small percentage of individuals are of a different form to the others, being quite parallel-sided; whether this abnormal form is of advantage or otherwise to the individual does not appear.

In the following list the names of the captors or recorders of species when other than the author are given after each entry. The entomologists referred to are: C. C. Babington, F.R.S., Professor of Botany at the University of Cambridge; T. Hudson Beare, F.E.S.; Alfred Beaumont, F.E.S.; E. C. Bedwell, F.E.S.; W. G. Blatch, F.E.S. (ob. 1900); J. B. Bridgman, F.L.S., F.E.S. (ob. 1899); Thos. Brightwell, F.L.S., formerly of Norwich; the Rev. J. Landy Browne of Norwich; the Rev. John Burrell, A.M., F.L.S., F.E.S., Rector of Letheringsett (ob. 1825); E. A. Butler, F.E.S.; G. C. Champion, F.Z.S., F.E.S.; the late Rev. Hamlet Clark; the late G. R. Crotch; the Rev. C. T.

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Cruttwell, sometime Vicar of Denton ; John Curtis, in *British Entomology* ; the Rev. J. F. Dawson, in *Geodephaga Britannica* ; Henry Denny, author of *Monographia Pselapidarum et Scyamænidarum Britannicæ*, Norwich, 1825 ; H. St. J. Donisthorpe, F.E.S. ; T. P. Dossetor, who lived in Norwich 1876-87 ; E. G. Elliman, F.E.S. ; the Rev. Canon Fowler, in *The Coleoptera of the British Isles* ; W. L. Fox of Harleston (ob. 1866) ; Charles Garneys, surgeon, formerly of Bungay ; William Garneys, formerly of Bungay ; M. J. Griffin, formerly of Norwich ; A. H. Haworth, F.L.S., author of *Lepidoptera Britannica* (ob. 1833) ; W. C. Hewitson ; Joseph Hooker formerly of Norwich ; the Rev. W. Kirby, F.R.S. ; W. E. Leach, M.D., F.L.S. ; John Lindley, F.R.S., Professor of Botany, University College, London ; the Rev. A. Matthews, in *Trichopterygia Illustrata et Descripta*, 1872 ; Frank Norgate, sometime of Sparham ; C. J. and J. Paget, in *A Sketch of the Natural History of Great Yarmouth and its Neighbourhood* ; Robert Paul formerly of Starston Hall ; the late J. A. Power, M.D. ; the late E. C. Rye, co-editor of *The Entomologist's Monthly Magazine* ; J. D. Salmon, sometime of Thetford ; Robert Scales of Halvergate and afterwards of Beachamwell (ob. 1828) ; David Sharp, F.R.S. ; the Rev. T. Skrimshire of Syderstone (circ. 1825) ; the late F. Smith of the British Museum ; Joseph Sparshall formerly of Norwich ; J. F. Stephens, in *Illustrations of British Entomology* ; the Rev. A. Thornley, F.E.S. ; H. J. Thouless of Norwich ; J. J. Walker, R.N., F.E.S. ; the late John Walton, F.L.S. ; C. O. Waterhouse of the British Museum ; Robert Wigham formerly of Norwich ; Simon Wilkin, F.L.S., formerly of Norwich ; the late T. V. Wollaston, F.L.S. ; the Rev. Theodore Wood, F.E.S.

CICINDELIDÆ

- Cicindela campestris*, L.
— *maritima*, Dej.

CARABIDÆ

CYCHRINA

- Cychrus rostratus*, L.

CARABINA

- Carabus catenulatus*, Scop.
— *nemoralis*, Müll.
— *violaceus*, L.
— *clathratus*, L. *Halvergate* (Haworth
fide Stephens) ; *Burgh Marshes* (Paget) ;
Bungay (Garneys)
— *granulatus*, L.
— *monilis*, F.
— *arvensis*, F. *Norfolk* (Bridgman)
Calosoma inquisitor, L. *St. Faiths Wood*,
before 1830 (J. Hooker)
— *sycophanta*, L. *Norwich* (Stephens)

NOTIOPHILINA

- Notiophilus biguttatus*, F.
— *substriatus*, Wat.
— *4-punctatus*, Dej. *Cromer, Yarmouth*
(Thouless)

NOTIOPHILINA (continued)

- Notiophilus aquaticus*, L.
— *palustris*, Duft.
— *rufipes*, Curt. *Sparham* (Norgate) ;
Hunstanton (Fowler)

NEBRIINA

- Leistus spinibarbis*, F.
— *fulvibarbis*, Dej.
— *ferrugineus*, L.
— *rufescens*, F.
Nebria livida, F. *Cromer* (Thouless) ;
Gimingham (Butler) ; *Happisburgh*
(Wood)
— *brevicollis*, F.

ELAPHRINA

- Blethisa multipunctata*, L. *Bardolphe Fen*
(Burrell) ; *Horning, Hethersett* (Cur-
tis) ; *Norwich*, before 1829 (Wig-
ham) ; *Yarmouth* (Paget)
Elaphrus riparius, L.
— *cupreus*, Duft.

LORICERINA

- Loricera pilicornis*, F.

SCARITINA

- Clivina fossor*, L.

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SCARITINA (*continued*)

- Clivina collaris*, Hbst.
- Dyschirius thoracicus*, Rossi. *Wretbam Heath* (Thouless); *Gimingham* (Butler)
- *politus*, Dej. *Norfolk Coast* (Dawson)
- *nitidus*, Dej. „ „ (Fowler)
- *æneus*, Dej. *Waxham* (Champion); *Hunstanton* (Thornley)
- *globosus*, Hbst.

BROSCINA

- Brosicus cephalotes*, L.

PANAGÆINA

- Panagæus crux-major*, L. *Horning* (Wig-ham); *Caistor* (Paget)

LICININA

- Badister bipustulatus*, F.
- *sodalis*, Duft. *Harford Bridges, Nor-wich* (Beaumont)
- *peltatus*, Panz. *Brandon* (Thouless)
- Licinus depressus*, Payk. *Mousehold Heath*, 1810 (Curtis)

CHLÆNIINA

- Chlænius vestitus*, Payk.
- *holosericeus*, F. *Norfolk* (Skrimshire)

ODINA

- Oodes helopioides*, F.

STENOLOPHINA

- Stenolophus skrimshiranus*, Steph. *Faken-bam* (Skrimshire)
- *vespertinus*, Panz. *Norwich* (Griffin)
- Acupalpus meridianus*, L.
- Bradycellus placidus*, Gyll. *Horning* (Thouless)
- *cognatus*, Gyll.
- *verbasci*, Duft.
- *harpalinus*, Dej.
- *collaris*, Payk.
- *similis*, Dej.

HARPALINA

- Harpalus rotundicollis*, Fairm. *Yarmouth*
- *punctatulus*, Duft.
- *azureus*, F. *Norfolk* (Stephens)
- *rupicola*, Sturm. *Hunstanton* (Fowler)
- *puncticollis*, Payk. *Lakenham* (Thouless)
- *rectangulus*, Thoms.
- *rufibarbis*, F.
- *ruficornis*, F.
- *æneus*, F.
- *consentaneus*, Dej. *Yarmouth*; *Hun-stanton* (Fowler)
- *rubripes*, Duft.
- *discoideus*, F. *Brandon* (Walker)
- *latus*, L.
- *melancholicus*, Dej. *Yarmouth*
- *tardus*, Panz.
- *servus*, Duft. *Yarmouth*; *Hunstanton* (Fowler)
- *anxius*, Duft. *Yarmouth*
- *ignavus*, Duft. *Mousehold Heath, Holkham*

HARPALINA (*continued*)

- Harpalus picipennis*, Duft. *Thetford*, August, 1888. *Norfolk Coast* (Dawson)

ANISODACTYLINA

- Dichirotrichus pubescens*, Payk.
- Anisodactylus binotatus*, F. Banks of the *Yare* at *Postwick*

ZABRINA

- Zabrus gibbus*, F. *Norfolk* (Burrell's list)

PTEROSTICHINA

- Stomis pumicatus*, Panz.
- Platyderus ruficollis*, Marsh. *Norwich*
- Pterostichus cupreus*, L.
- *dimidiatus*, Ol. *Mousehold Heath*, 1883
- *lepidus*, F. *Norfolk* (Dawson)
- *madidus*, F.
- *aterrimus*, Payk. *Horning* (Curtis)
- *niger*, Schall.
- *vulgaris*, L.
- *anthracinus*, Ill. *Norfolk* (Stephens)
- *nigrita*, F.
- *minor*, Gyll.
- *strenuus*, Panz.
- *diligens*, Sturm.
- *picimanus*, Duft. *Hunstanton* (Fowler); *Denton* (Cruttwell); *Sparham* (Nor-gate)
- *vernalis*, Gyll.
- *striola*, F.

AMARINA

- Amara fulva*, Dej. *Mousehold Heath*
- *apricaria*, Sturm.
- *consularis*, Duft. *Mousehold Heath*; *Brandon, Hunstanton* (Fowler)
- *spinipes*, Auct.
- *convexiuscula*, Marsh. *Cley*; *Hunstan-ton* (Fowler)
- *infima*, Duft. *Norfolk* (Stephens)
- *rufocincta*, Dej. *Yarmouth* (Thouless)
- *bifrons*, Gyll. *Postwick Grove*, 1875; *Cromer*, 1890 (Thouless)
- *ovata*, F.
- *similata*, Gyll.
- *acuminata*, Payk. *Mousehold Heath* (Thouless)
- *tibialis*, Payk.
- *lunicollis*, Schiod. *Mousehold Heath*, *Horning* (Thouless)
- *familiaris*, Duft.
- *lucida*, Duft.
- *trivialis*, Gyll.
- *communis*, Panz.
- *plebeia*, Gyll. *Norwich* (Thouless) *

ANCHOMENINA

- Calathus cisteloides*, Panz.
- *fuscus*, F.
- *flavipes*, Fourc.
- *mollis*, Marsh.
- *melanocephalus*, L.

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ANCHOMENINA (*continued*)

- Calathus piceus*, Marsh.
Taphria nivalis, Panz.
Pristonychus terricola, Hbst.
Sphodrus leucophthalmus, L. *Lower Close, Norwich*

Anchomenus dorsalis, Müll.

- *albipes*, F.
 — *oblongus*, Sturm. *Near Norwich*
 (*Griffin fide Stephens*)
 — *livens*, Gyll. *Norfolk* (Stephens)
 — *marginatus*, L. *Norwich*; *Yarmouth*
 (Paget); *Salthouse* (Thouless)
 — *sexpunctatus*, L. *St. Faiths* (Brown)
 — *parumpunctatus*, F.
 — *atratus*, Duft. *Norwich* (Dossetor)
 — *viduus*, Panz.; var. *mœstus*, Duft.
 — *fuliginosus*, Panz.
 — *gracilis*, Gyll.
 — *thoreyi*, Dej. *Weybourne*
 — *puellus*, Dej.
Olisthopus rotundatus, Payk.

BEMBIDIINA

- Cillenus lateralis*, Sam. *Cley*, before 1828
 (*Brightwell*); *Heacham* (Fowler);
 Cromer (Thouless)
Bembidium rufescens, Guer.
 — *quinquestriatum*, Gyll.
 — *obtusum*, Sturm.
 — *guttula*, F.
 — *mannerheimi*, Sahl. *Brundall*
 — *biguttatum*, F.
 — *riparium*, Ol. *Stoke Holy Cross, Bixley*
 — *æneum*, Germ. *Trowse*
 — *fumigatum*, Duft. *Ranworth*
 — *assimile*, Gyll. *Brundall*
 — *clarki*, Daws. *St. Faiths*
 — *articulatum*, Panz.
 — *minimum*, F. *Cley*, etc.
 — *normannum*, Dej. *Hunstanton, Mor-*
 ston
 — *lampros*, Hbst.
 — „ var. *velox*, Er.
 — *nitidulum*, Marsh. } *Gimingham* (Butler);
 — *affine*, Steph. } *Cromer* (Elliman)
 — *stomoides*, Dej. *Mousehold Heath*
 — *quadriguttatum*, F.
 — *quadrimaculatum*, Gyll.
 — *lunatum*, Duft. *Norfolk* (Fowler)
 — *testaceum*, Duft. *Mousehold Heath*
 — *femoratum*, Sturm. *Aylsham* (Wood)
 — *bruxellense*, Wesm. *Brumstead Com-*
 mon
 — *saxatile*, Gyll.
 — *anglicanum*, Shp. *Gimingham* (Butler);
 Cromer (Elliman)
 — *littorale*, Ol.
 — *pallidipenne*, Ill. *Norfolk Coast* (Fowler)
 — *ephippium*, Marsh. *Cley*, August, 1888
 — *flammulatum*, Clairv.

BEMBIDIINA (*continued*)

- Bembidium varium*, Ol. *Breydon Bank*
 (Paget)
Tachypus pallipes, Duft. *Cromer* (Thou-
 less; Wood)
 — *flavipes*, L.

TRECHINA

- Trechus discus*, *Norfolk* (Stephens)
 — *micros*, Hbst. *Denton* (Cruttwell)
 — *rubens*, F. *Waxham* (Champion)
 — *minutus*, F.
 — *secalis*, Payk. *Norfolk Coast* (Stephens)
Patrobus excavatus, Payk.
Pogonus luridipennis, Germ. *Salthouse* (Bur-
 rell, 1806; Brown, 1840)
 — *chalcus*, Marsh.

MASOREINA

- Masoreus wetterhalii*, Gyll. *Hunstanton*
 (Fowler)

CYMINDINA

- Cymindis axillaris*, F. *Witchingham Heath*,
 1810 (Curtis)

ODACANTHINA

- Odacantha melanura*, Payk. *Brundall*, etc.

LEBIINA

- Lebia chlorocephala*, Hoff.
Ætrophorus imperialis, Germ. *Horning*,
 etc. (Fowler); *Palling*, April, 1889
 (Cruttwell)
Demetrius unipunctatus, Germ. *Holkham*
 — *atricapillus*, L.
Dromius longiceps, Dej. *Horning*
 — *linearis*, Ol.
 — *agilis*, F.
 — *meridionalis*, Dej.
 — *quadrimaculatus*, L.
 — *quadrinotatus*, Panz.
 — *quadrisignatus*, Dej. *Norwich*
 — *melanocephalus*, Dej.
 — *nigriventris*, Thoms. *Norwich district*
 (Dossetor)
Blechrus maurus, Sturm.
Metabletus foveola, Gyll.
 — *truncatellus*, L.
 — *obscuro-guttatus*, Duft. *Norfolk* (Fow-
 ler)

POLYSTICHINA

- Polystichus vittatus*, Brull. *Cley* (Leach
 fide Stephens)

HALIPLIDÆ

- Brychius elevatus*, Panz.
Haliplus obliquus, F. } *Ranworth*, etc.
 — *confinis*, Steph. }
 — *flavicollis*, Sturm. *Colney, Heigham*
 — *fulvus*, F. *Horning*
 — *variegatus*, Sturm. *Ranworth*
 — *ruficollis*, De G.
 — *fluvialilis*, Aub.

INSECTS

Haliplus striatus, Shp.
— *lineatocollis*, Marsh.
Cnemidotus impressus, F.

PELOBIIDÆ

Pelobius tardus, Hbst. *Swardston Common, Wretham Heath, Mousehold Heath*

DYTISCIDÆ

NOTERINA

Noterus clavicornis, De G.
— *sparsus*, Marsh.

LACCOPHILINA

Laccophilus interruptus, Panz.
— *obscurus*, Panz.

HYDROPORINA

Bidessus unistriatus, Schr. *Hickling; Waxham (Champion)*
— *geminus*, F. *Brandon*
Hyphydrus ovatus, L.
Cœlambus versicolor, Schall.
— *inæqualis*, F.
— *decoratus*, Gyll. *Horning, Brandon; Waxham (Champion)*
— *confluens*, F. *Mousehold Heath, Weybourne*
— *parallelogrammus*, Ahr. *Cley, Mousehold Heath; Waxham (Champion)*
— *impressopunctatus*, Sch. *Brandon; Waxham (Champion)*
Deronectes assimilis, Payk. *Colney; Aylsham (Wood); Waxham (Champion)*
— *depressus*, F.
— *12-pustulatus*, F. *Colney; Stalham (Wood); Waxham (Champion)*
Hydroporus pictus, F.
— *granularis*, L. *Horning; Waxham (Champion)*
— *lepidus*, Ol.
— *davisi*, Curt. *Harleston district (Fox)*
— *halensis*, F. *Horning (Clark); Brundall (Sharp and Crotch)*
— *dorsalis*, F.
— *lineatus*, F.
— *scalesianus*, Steph. *Norfolk (Scales fide Stephens)*
— *neglectus*, Schaum. *Stratton Strawless, 1875*
— *umbrosus*, Gyll.
— *angustatus*, Sturm.
— *gyllenhali*, Schiod.
— *vittula*, Er.
— *palustris*, L.
— *incognitis*, Shp. *Arminghall*
— *erythrocephalus*, L.
— *rufifrons*, Duft. *Brandon*

HYDROPORINA (continued)

Hydroporus memnonius, Nic.
— *obscurus*, Sturm. *St. Faiths; Waxham (Champion)*
— *nigrita*, F. *Brooke; Waxham (Champion)*
— *pubescens*, Gyll.
— *planus*, F.
— *lituratus*, F.
— *ferrugineus*, Steph. *Horning*
— *oblongus*, Steph. *Brandon; Horning (Fowler)*

DYTISCINA

Agabus paludosus, F. *Eaton Common; Aylsham (Wood)*
— *uliginosus*, L. *Horning, March 5, 1840 (Brown); Yarmouth (Paget)*
— *unguicularis*, Thoms. *Brandon; Horning (Brown); Waxham (Champion)*
— *didymus*, Ol. *Mousehold Heath (Thouless); Aylsham (Wood)*
— *congener*, Payk. *Norfolk (Stephens)*
— *nebulosus*, Forst.
— *conspersus*, Marsh. *Cley (Thouless); Waxham (Champion)*
— *striolatus*, Gyll. *Horning, March, 1839 and 1840 (Brown); not recorded as occurring elsewhere in Britain*
— *femoralis*, Payk. *Wretham Heath*
— *abbreviatus*, F. *Norfolk (Stephens)*
— *sturmii*, Gyll.
— *chalconotus*, Panz.
— *bipustulatus*, L.
Platambus maculatus, L.
Ilybius fuliginosus, F.
— *fenestratus*, F.
— *ater*, De G.
— *obscurus*, Marsh.
— *guttiger*, Gyll. *Horning, St. Faiths*
— *subæneus*, Er. *Brandon, Wretham Heath; St. Faiths (Thouless)*
— *ænescens*, Thoms. *St. Faiths*
Copelatus agilis, F.
Rhantus grapei, Gyll.
— *exoletus*, Forst.
— *pulverosus*, Steph.
— *notatus*, Berg.
— *bistriatus*, Berg.
— *adspersus*, F. *Norfolk (Stephens)*
Colymbetes fuscus, L.
Dytiscus punctulatus, F.
— *marginalis*, L.
— *circumflexus*, F. *Yarmouth (Paget); Burgh Castle (Thouless)*
— *dimidiatus*, Berg. *Yarmouth (Paget)*
Hydaticus transversalis, Berg. *Lakenham, Sept. 13, 1898*
Acilius sulcatus, L.

A HISTORY OF NORFOLK

GYRINIDÆ

- Gyrinus minutus*, F. *Hickling Broad, Horning*
 — *suffriani*, Scriba. *Horning, Ranworth, Hickling Broad, Roydon Fen*
 — *colymbus*, Er. *Ranworth, Hickling Broad*
 — *natator*, Scop.
 — *elongatus*, Aub.
 — *bicolor*, Payk. *Hickling Broad; Horning* (Fowler)
 — *marinus*, Gyll.
 — *opacus*, Sahl.
Orectochilus villosus, Müll.

HYDROPHILIDÆ

HYDROPHILINA

- Hydrophilus piceus*, L. *Horning* (Wigham); *Brundall* (Brown); *Yarmouth* (Paget); *Waxham* (Champion)
Hydrous caraboides, L. Burrell's list. *Yarmouth* (Paget)
Hydrobius fuscipes, L.
 — *piciprus*, Thoms
Anacæna globulus, Payk.
 — *limbata*, F.
 — *bipustulata*, Steph. *Arminghall*
Philydrus testaceus, F.
 — *maritimus*, Thoms
 — *nigricans*, Zett.
 — *melanocephalus*, Ol. *Brandon*
 — *minutus*, F. *Brandon, St. Faiths*
 — *coarctatus*, Gredl.
Cymbiodyba ovalis, Thoms. *Horning*
Enochrus bicolor, Gyll.
Helochares lividus, Forst.
 — *punctatus*, Shp.
Laccobius sinuatus, Mots.
 — *alutaceus*, Thoms.
 — *minutus*, L.
 — *bipunctatus*, F.
Berosus spinosus, Stev. *Hunstanton* (Fowler)
 — *signaticollis*, Charp. *St. Faiths; Yarmouth* (Paget)
 — *luridus*, L.
 — *affinis*, Brull. *Hunstanton* (Thornley)
Limnebius truncatellus, Thoms.
 — *papposus*, Muls.
 — *nitidus*, Marsh.
 — *picipus*, Marsh. *Hunstanton* (Fowler); *Waxham* (Champion)
Chætarthria seminulum, Hbst. *Arminghall; Waxham* (Champion)

HELOPHORINA

- Helophorus rugosus*, Ol.
 — *nubilus*, F.
 — *intermedius*, Muls. *Cley*, etc.

HELOPHORINA (continued)

- Helophorus aquaticus*, L.
 — *dorsalis*, Marsh. *Norwich*
 — *æneipennis*, Thoms.
 — *mulsanti*, Rye. *Wretham Heath*, May 26, 1890
 — *affinis*, Marsh. *Mousehold Heath*
 — *brevicollis*, Thoms. *Felthorpe*
 — *nanus*, Sturm. *Horning* (Fowler)
Hydrochus brevis, Hbst. *Horning; Stalham* (Wood)
 — *elongatus*, Schall.
 — *carinatus*, Germ. *Brandon*, May, 1888
 — *angustatus*, Germ.
Octhebius marinus, Payk.
 — *pygmæus*, F.
 — *bicolor*, Germ.
 — *rufimarginatus*, Steph. *Morston*, 1887
 — *ætatus*, Steph.
Hydræna riparia, Kug.
 — *gracilis*, Germ. *Lakenham*, Sept., 1898

SPHÆRIDIIINA

- Cyclonotum orbiculare*, F.
Sphæridium scarabæoides, F.
 — *bipustulatum*, F.
 — „ v. *marginatum*, F.
Cercyon littoralis, Gyll.
 — *depressus*, Steph. *Hunstanton* (Thornley)
 — *hæmorrhous*, Gyll.
 — *hæmorrhoidalis*, Hbst.
 — *aquaticus*, Muls. *Waxham* (Champion)
 — *flavipes*, F.
 — *lateralis*, Marsh.
 — *melanocephalus*, L.
 — *unipunctatus*, L.
 — *quisquilius*, L.
 — *nigriceps*, Marsh.
 — *pygmæus*, Ill.
 — *terminatus*, Marsh. *Norwich*
 — *analis*, Payk.
 — *lugubris*, Payk. *Norwich*
 — *granarius*, Er.
 — *minutus*, Muls.
Megasternum boletophagum, Marsh
Cryptopleurum atomarium, F.

STAPHYLINIDÆ

ALEOCHARINA

- Aleochara ruficornis*, Grav. *Norfolk* (Lindley *vide* Stephens)
 — *fuscipes*, F.
 — *brevipennis*, Grav.
 — *lanuginosa*, Grav.
 — *villosa*, Mann. *Arminghall*
 — *mœsta*, Grav.
 — *nitida*, Grav.
 — „ var. *bilineata*, Gyll.
 — *morian*, Grav.
 — *grisea*, Kr.

INSECTS

ALEOCHARINA (*continued*)

- Aleochara algarum*, Fauv. *Hunstanton*
 (Thornley)
Microglossa suturalis, Sahl.
 — *pulla*, Gyll. *Gimingham* (Butler)
 — *nidicola*, Fairm.
Oxypoda lividipennis, Mann.
 — *opaca*, Grav.
 — *alternans*, Grav.
 — *umbrata*, Grav. *Gimingham* (Butler)
 — *longiuscula*, Er.
 — *formiceticola*, Märk.
 — *hæmorrhœa*, Mann.
Thiasophila angulata, Er.
Ischnoglossa prolixa, Grav.
Ocyusa maura, Er.
 — *picina*, Aub. *Horning*
Ocalea castanea, Er.
Ilyobates nigricollis, Payk. *Brundall; Horning* (Fowler)
Calodera nigrita, Mann.
 — *æthiops*, Grav.
Chilopora longitarsis, Steph.
Atemeles emarginatus, Payk. *Near Norwich* (Wigham)
Myrmedonia haworthi, Steph. *Norfolk* (Stephens)
 — *collaris*, Payk. *Horning; Postwick* (Dossetor)
 — *limbata*, Payk. *Norwich*
 — *humeralis*, Grav. } *Norwich* (Dossetor)
 — *laticollis*, Märk. }
Astilbus canaliculatus, F.
Callicerus obscurus, Grav.
Alianta incana, Er. *Horning*, etc.
 — *plumbea*, Wat.
Homalota insecta, Thoms.
 — *gregaria*, Er.
 — *littorea*, Shp. *Salthouse* (Elliman)
 — *luteipes*, Er. *Horning* (Sharp)
 — *fallax*, Kr.
 — *luridipennis*, Mann.
 — *gyllenhali*, Thoms
 — *hygrotopora*, Kr.
 — *elongatula*, Grav.
 — *vestita*, Grav.
 — *vicina*, Steph.
 — *pagana*, Er.
 — *graminicola*, Gyll.
 — *halobrechtha*, Shp.
 — *puncticeps*, Thoms. *Gimingham* (Butler)
 — *nigella*, Er.
 — *æquata*, Er.
 — *angustula*, Gyll.
 — *linearis*, Grav.
 — *debilis*, Er.
 — *cæsula*, Er. *Thetford*
 — *cellularis*, Grav.
 — *immersa*, Heer.
 — *cuspidata*, Er.

ALEOCHARINA (*continued*)

- Homalota aubei*, Bris. *Horning* (Sharp)
 — *analis*, Grav.
 — *exilis*, Er.
 — *depressa*, Gyll.
 — *aquatica*, Thoms.
 — *æneicollis*, Shp.
 — *xanthoptera*, Steph.
 — *euryptera*, Steph.
 — *trinotata*, Kr.
 — *fungicola*, Thoms.
 — *ignobilis*, Shp.
 — *boletobia*, Thoms. *Gimingham* (Butler)
 — *coriaria*, Kr.
 — *gagatina*, Baudi
 — *palustris*, Kies.
 — *atomaria*, Kr. } *Norwich* (Dossetor)
 — *perexigua*, Shp. }
 — *sericea*, Muls.
 — *atricolor*, Shp. *Gimingham* (Butler); *Cromer* (Elliman)
 — *inquinula*, Grav.
 — *nigra*, Kr.
 — *hodierna*, Shp. *Horning* (Sharp)
 — *cauta*, Er.
 — *villosula*, Kr.
 — *fuscipes*, Heer. *Norfolk* (Crotch *vide* Fowler)
 — *atramentaria*, Gyll.
 — *intermedia*, Thoms.
 — *longicornis*, Grav.
 — *sordida*, Marsh.
 — *aterrima*, Grav.
 — *pygmæa*, Grav.
 — *muscorum*, Bris.
 — *laticollis*, Steph.
 — *montivagans*, Woll. *Horning* (Fowler)
 — *orbata*, Er. *Cromer* (Elliman)
 — *fungi*, Grav.
 — „ var. *dubia*, Shp.
Schistoglossa viduata, Er. *Merton* (Crotch)
Gnypeta labilis, Er.
Tachyusa scitula, Er. *Gimingham* (Butler)
 — *flavitaris*, Sahl.
 — *umbratica*, Er. *Waxham* (Champion)
 — *atra*, Grav.
Xenusa sulcata, Kies. *Hunstanton, Heacham* (Fowler)
Falagria sulcata, Payk.
 — *sulcata*, Grav.
 — *thoracica*, Curt. *Hunstanton*, 1807 (Kirby *vide* Stephens)
 — *obscura*, Grav.
Autalia impressa, Ol.
 — *rivularis*, Gr.
Encephalus complicans, Westw. *Hunstanton* (Fowler).
Gyrophæna affinis, Mann.
 — *gentilis*, Er.
 — *nana*, Payk. *Hunstanton* (Fowler)

A HISTORY OF NORFOLK

ALEOCHARINA (*continued*)

- Gyrophæna fasciata, Marsh. *Hunstanton*
(Fowler)
— lævipennis, Kr.
— manca, Er. } *Norwich* (Dossetor)
Agaricocchara lævicollis }
Placusa infima, Er. *Cromer* (Elliman)
Epipeda plana, Gyll.
Silusa rubiginosa, Er. *Wroxham* (Fowler);
Norwich, 1889 (Walker)
Leptusa fumida, Er.
Bolitochara obliqua, Er.
Phylosus spinifer, Curt. } *Waxham*
— balticus, Kr. } (Champion)
Diglossa mersa, Hal. *Hunstanton* (Fowler)
Hygronoma dimidiata, Grav.
Oligota inflata, Mann.
— atomaria, Er. *Horning*
— punctulata, Heer.
Myllæna dubia, Grav.
— intermedia, Er.
— gracilis, Matth.
— brevicornis, Matth.
Gymnusa brevicollis, Payk. *Horning*
Deinopsis erosa, Steph.

TACHYPORINA

- Hypocypus longicornis, Payk.
— seminulum, Er.
— discoideus, Er. *Horning* (Fowler)
Conosoma littoreum, L.
— pubescens, Grav.
— immaculatum, Steph.
— lividum, Er.
Tachyporus obtusus, L.
— formosus, Matth. *Aylsham* (Wood)
— solutus, Er.
— pallidus, Shp. *Horning* (Fowler)
— chrysomelinus, L.
— humerosus, Er.
— tersus, Er.
— hypnorum, F.
— pusillus, Grav.
— brunneus, F.
— transversalis, Grav.
Cilea silphoides, L.
Tachinus humeralis, Grav.
— rufipes, L.
— subterraneus, L.
— marginellus, F.
— laticollis, Grav.
— collaris, Grav.
Megacronus analis, F.
Bolitobius lunulatus, L.
— trinotatus, Er.
— exoletus, Er.
— pygmæus, F.
Mycetoporus splendens, Marsh.
— lepidus, Grav.
— longulus, Mann.
— angularis, Rey. *Waxham* (Champion)

TACHYPORINA (*continued*)

- Mycetoporus clavicornis, Steph. *Waxham*
(Champion)
— splendidus, Grav.
— longicornis, Kr. *Horning*
Habrocerus capillaricornis, Grav.
STAPHYLININA
Heterothops binotata, Er. *Hunstanton*
(Fowler)
— prævia, Er.
— dissimilis, Grav. *Horning*
Quedius microps, Grav. *Hunstanton* (Fowler)
— cruentus, Ol.
— cinctus, Payk.
— fuliginosus, Grav.
— tristis, Grav.
— molochinus, Grav.
— picipes, Mann.
— nigriceps, Kr.
— fumatus, Steph.
— maurorufus, Grav.
— rufipes, Grav.
— attenuatus, Gyll.
— semiæneus, Steph. *Hunstanton* (Fowler)
— boops, Grav.
Creophilus maxillosus, L.
Emus hirtus, L. *Beechamwell* (Scales *vide*
Curtis)
Leistotrophus nebulosus, F.
Staphylinus pubescens, De G.
— stercorarius, Ol.
— erythropterus, L. *Horning*
— cæsareus, Ceder.
Ocypus olens, Müll.
— cyaneus, Payk. *Mousehold Heath*,
Lakenham; *Drayton* (Thouless)
— brunnipes, F.
— cupreus, Rossi.
— pedator, Grav. *Caistor* (Paget)
— ater, Grav.
— morio, Grav.
— compressus, Marsh. *Norwich*; *Hunstanton* (Fowler)
Philonthus intermedius, Boisd.
— laminatus, Creutz.
— æneus, Rossi.
— decorus, Grav.
— politus, F.
— lucens, Er. *Kirby Bedon*
— varius, Gyll.
— marginatus, F. *Mousehold Heath*
— umbratilis, Grav. *East Rudham* (Wood)
— cephalotes, Grav.
— fimetarius, Grav.
— sordidus, Grav.
— ebeninus, Grav.
— debilis, Grav.
— sanguinolentus, Grav.

INSECTS

STAPHYLININA (*continued*)

- Philonthus cruentatus, Gmel.
- longicornis, Steph.
- varians, Payk.
- agilis, Grav. *Ringland*, 1876
- vernalis, Grav. *Hunstanton* (Blatch)
- discoideus, Grav. *Norwich*; *Cromer, Aylsham* (Wood)
- quisquiliarius, Gyll.; var. dimidiatus, Er.
- nigrita, Nord. *Ringland*, 1876
- fumarius, Grav. *Arminghall*, 1876;
East Rudham (Wood)
- micans, Grav.
- trossulus, Nord.
- fulvipes, F. *Norfolk Coast* (Skrimshire
fide Stephens)
- Cafius xantholoma, Grav.
- Actobius cinerascens, Grav. *Arminghall*,
October, 1876
- Xantholinus fulgidus, F.
- glabratus, Grav.
- punctulatus, Payk.
- ochraceus, Gyll.
- tricolor, F. *Hunstanton* (Fowler);
Cromer (Wood)
- linearis, Ol.
- longiventris, Heer.
- Leptacinus batychnus, Gyll. *Cromer*
(Wood)
- linearis, Grav.
- Othius fulvipennis, F.
- læviusculus, Steph.
- melanocephalus, Grav.
- myrmecophilus, Kies. *Dunston Com-*
mon, September, 1874

PÆDERINA

- Lathrobium elongatum, L. *Ranworth*
- fulvipenne, Grav.
- rufipenne, Gyll. *Horning* (Fowler)
- brunnipes, F.
- quadratum, Payk. *Waxham* (Cham-
pion)
- terminatum, Grav.
- pallidum, Nord. *Cromer* (Elliman)
- multipunctum, Grav. *Postwick Grove*,
September, 1874
- Achenium humile, Nic. *Salthouse*, October,
1890
- Stilicus rufipes, Germ.
- orbiculatus, Er. *Hellesdon*, April, 1879
- affinis, Er.
- subtilis, Er. *Roughton*, August, 1900
(Beare)
- Scopæus sulcicollis, Steph. *Cromer* (Elli-
man)
- Medon propinquus, Bris.
- melanocephalus, F.
- Lithocharis ochracea, Grav.
- Sunius diversus, Aub. *Ranworth*, Oct.,
1888

PÆDERINA (*continued*)

- Sunius augustatus, Payk.
- Pæderus littoralis, Grav.
- riparius, L. *Waxham* (Champion)

EVÆSTHETINA

- Evæsthetusscaber, Thoms. *Norfolk* (Denny
fide Stephens)

STENINA

- Stenus bipunctatus, Er. *Cromer* (Elliman)
- guttula, Müll. *Gimingham* (Butler);
Cromer (Elliman)
- bimaculatus, Gyll.
- junco, F.
- longitarsis, Thoms. *Trowse*, Feb.,
1877
- proditor, Er. *Horning* (Crotch)
- speculator, Er.
- providus, Er.; var. rogeri, Kr.
- lustrator, Er. *Waxham* (Champion)
- buphthalmus, Grav.
- melanopus, Marsh. *Norfolk Fens*
(Rye)
- incrassatus, Er. *Waxham* (Champion);
Aylsham, East Rudham (Wood)
- melanarius, Steph. *Horning* (Fowler)
- atratulus, Er. *Gimingham* (Butler)
- canaliculatus, Gyll. *Aylsham, East*
Rudham (Wood)
- nitens, Steph. *Horning* (Crotch);
Waxham (Champion)
- pusillus, Er.
- fuscipes, Grav. *Horning* (Crotch)
- vafellus, Er. *Horning* (Crotch); *Wax-*
ham (Champion)
- opticus, Grav. *Horning, Ranworth*
(Crotch); *Potter Heigham* (Wood)
- carbonarius, Gyll. *East Rudham*
(Wood); *Horning, Ranworth* (Crotch)
- argus, Grav. } *Horning* (Crotch)
- nigrutilus, Gyll. }
- brunnipes, Steph.
- ossium, Steph.
- palustris, Er. *Horning* (Fowler)
- impressus, Germ.
- ærosus, Er. *Hunstanton* (Fowler)
- erichsoni, Rye. *Aylsham* (Wood)
- flavipes, Steph.
- pubescens, Steph.
- binotatus, Ljun.
- pallitarsis, Steph.
- bifoveolatus, Gyll.
- nitidiusculus, Steph.
- picipes, Steph.
- cicindeloides, Grav.
- similis, Hbst.
- solutus, Er. *Horning* (Fowler)
- tarsalis, Lynn.
- paganus, Er. *Ringland*; *Waxham*
(Champion); *East Rudham* (Wood)
- latifrons, Er.

A HISTORY OF NORFOLK

STENINA (*continued*)

Stenus fornicatus, Steph. *Stratton Strawless*; *Horning* (Fowler); *Waxham* (Champion)

OXYPORINA

Oxyporus rufus, L.

OXYTELINA

Bledius taurus, Germ. *Salthouse*; *Wells*, etc. (Fowler)

— *tricornis*, Hbst. *Salthouse* (Brown); *Hunstanton* (Fowler)

— *unicornis*, Germ. *Hunstanton* (Fowler)

— *fuscipes*, Rye. *Gimingham* (Butler); *Cromer* (Elliman)

— *subterraneus*, Er. *Cromer* (Fowler)

— *longulus*, Er. *Gimingham* (Butler)

— *fratricornis*, Payk. *Norwich*

— *opacus*, Block. *Hunstanton* (Fowler)

— *atricapillus*, Germ. *Wells* (Fowler); *Waxham* (Champion)

Platystethus arenarius, Fourc.

— *cornutus*, Gill. *Norwich* (Dossetor)

Oxytelus rugosus, Grav.

— *sculptus*, Grav.

— *laqueatus*, Marsh.

— *inustus*, Grav.

— *sculpturatus*, Grav.

— *nitidulus*, Grav.

— *complanatus*, Er.

— *tetracarinatus*, Block.

Haploderus coelatus, Grav.

Trogophlæus bilineatus, Steph.

— *elongatulus*, Er.

— *fuliginosus*, Grav. *Norfolk* (Fowler)

— *pusillus*, Grav.

Syntomium æneum, Müll. *Gimingham* (Butler)

Coprophilus striatulus, F.

OMALIINA

Lesteva longelytrata, Goeze.

— *punctata*, Er. *Trowse*; *Waxham* (Champion)

Acidota crenata, F. *Norwich*

Olophrum piceum, Gyll.

Lathrimæum atrocephalum, Gyll.

— *unicolor*, Steph.

Philorhinum sordidum, Steph. *East Rudham* (Wood)

Omalium rivulare, Payk.

— *læviusculum*, Gyll.

— *riparium*, Thoms.

— *excavatum*, Steph.

— *cæsum*, Grav.

— *pusillum*, Grav.

— *rufipes*, Fourc. *Norfolk* (Fowler)

— *vile*, Er.

— *planum*, Payk. *Norfolk* (Fowler)

— *concinnum*, Marsh.

— *deplanatum*, Gyll. } *Norfolk* (Fowler)

— *striatum*, Grav. }

OMALIINA (*continued*)

Anthobrium minutum, F.

— *ophthalmicum*, Payk.

— *torquatum*, Marsh.

PROTEINA

Proteinus ovalis, Steph.

— *brachypterus*, F.

— *atomarius*, Er. *Hunstanton* (Fowler)

Megarthus denticollis, Beck. *Thorpe*, September, 1876

— *depressus*, Lac.

— *sinuatocollis*, Lac.

— *hemipterus*, Ill. *Norfolk* (Fowler)

Phlæobium clypeatum, Müll.

PIESTINA

Prognatha quadricornis, Lac. *Norfolk* (Denny *vide* Stephens)

PSELAPHIDÆ

PSELAPHINA

Pselaphus heisei, Hbst. *Norfolk* (Denny)

— *dresdensis*, Hbst. *Horsford Heath*, Aug. 17, 1886; *Loddon*, *Woodbastwick* (Denny)

Tychus niger, Payk.

Bythinus puncticollis, Denny } *Horning*

— *validus*, Aub. } (Denny)

— *bulbifer*, Reich.

— *curtisi*, Denny

— *burrelli*, Denny. Near *Letheringsett*, April, 1884 (Burrell)

Bryaxis sanguinea, L. *Waxham* (Champion); *Congham* (Wood)

— *fossulata*, Reich.

— *helferi*, Schmidt. *Weybourne*

— *hæmatica*, Reich.

— *juncorum*, Leach

— *impressa*, Panz. *Horning*; *Congham* (Wood)

Trimium brevicorne, Reich. *Norfolk* (Denny)

Euplectus karsteni, Reich. } *South Creak*

— *nanus*, Reich. } (Skrimshire)

— *sanguineus*, Denny

— *ambiguus*, Reich. *Horning* (Denny)

SCYDMÆNIDÆ

Neuraphes elongatulus, Müll.

— *angulatus*, Müll.

— *sparshalli*, Denny. *Arminghall Wood*, November, 1823 (Sparshall)

Scydmænus scutellaris, Müll.

— *collaris*, Müll.

— *exilis*, Er. *Norwich* (Fowler)

Euconnus denticornis, Müll. Near *Loddon* (Denny)

— *hirticollis*, Ill. *Horning* (Fowler)

— *finetarius*, Chaud.

Eumicrus tarsatus, Müll.

Cephennium thoracicum, Müll.

INSECTS

SILPHIDÆ

CLAMBINA

- Calyptromerus dubius*, Marsh. *Horning* (Elliman)
- Clambus pubescens*, Redt. *Gimingham* (Butler)
- *armadillo*, De G.
- *minutus*, Sturm. *Horning* (Fowler)

ANISOTOMINA

- Agathidium atrum*, Payk. Near *Norwich* (Kirby *fide* Stephens)
- *seminulum*, L.
- *lævigatum*, Er. *Dunston Common*
- *marginatum*, Sturm. *Norfolk Fens* (Fowler)
- Amphicyllis globus*, F. *Cromer* (Elliman)
- Liodes humeralis*, Kug. *Stratton Strawless*
- *orbicularis*, Hbst. *Ringland*, June, 1877
- Cyrtusa minuta*, Ahr. *Postwick Grove*, June, 1875
- Anisotoma dubia*, Kug. *Stratton Strawless*; *Waxham* (Champion)
- *badia*, Sturm. *Mousehold Heath*
- *scita*, Er. *Hunstanton* (Fowler)
- *punctulata*, Gyll. *Cromer* (Elliman)
- *calcarata*, Er.
- *curta*, Fairm. Near *Norwich* (Brown)
- *rugosa*, Sahl. *Mousehold Heath* (Griffin *fide* Stephens)
- Agaricophagus cephalotes*, Schmidt. *Ringland*, September, 1876
- Hydnobius punctatissimus*, Steph. *Weybourne*, October, 1888.

SILPHINA

- Necrophorus germanicus*, L. *Norfolk* (Burrell *fide* Curtis); *Mousehold Heath* (Stephens)
- *humator*, F.
- *mortuorum*, F.
- *vestigator*, Heer
- *ruspator*, Er.
- *interruptus*, Steph. *Norwich*; *Hunstanton* (Fowler)
- *vespillo*, L.
- Necrodes littoralis*, L.
- Silpha tristis*, Ill. Burrell's list
- *obscura*, L. Burrell's list. *Burgh Castle* (Paget)
- *quadripunctata*, L. } Burrell's list
- *reticulata*, F. }
- *opaca*, L. *Norfolk* (Burrell *fide* Curtis)
- *thoracica*, L. *Ringland*
- *rugosa*, L.
- *sinuata*, F.
- *dispar*, Hbst. *Norfolk* (Stephens)
- *lævigata*, T. Burrell's list
- *atrata*, L.

CHOLEVINA

- Choleva angustata*, F.
- *cisteloides*, Fröhl.

CHOLEVINA (continued)

- Choleva agilis*, Ill. *Mousehold Heath*, Oct., 1884
- *velox*, Spence
- *wilkini*, Spence. *Thorpe*, August, 1875
- *anisotomoides*, Spence
- *fusca*, Panz.
- *nigricans*, Sp. Near *Norwich* (Dossetor)
- *coracina*, Kell. *Brooke*, October, 1888
- *grandicollis*, Er. *Brandon*
- *tristis*, Panz.
- *kirbyi*, Spence. *Norwich*
- *chrysomeloides*, Panz.
- *fumata*, Spence
- *watsoni*, Spence
- Ptomophagus sericeus*, F.
- Colon brunneum*, Latr. *Stratton Strawless*, September, 1875

HISTERIDÆ

- Hister unicolor*, L.
- *merdarius*, Hoff. *Norwich*; *Aylsham* (Fowler)
- *cadaverinus*, Hoff.
- *stercorarius*, Hoff. *Norfolk* (Stephens)
- *purpurascens*, Hbst.
- *neglectus*, Germ. *Framingham Earl*, May, 1882
- *carbonarius*, Ill.
- *12-striatus*, Schr. *Thorpe Hamlet*, April, 1876
- *bimaculatus*, L.
- Carcinops minima*, Aubé.
- Dendrophilus punctatus*, Hbst. *Norwich* (J. Hooker *fide* Stephens)
- *pygmæus*, L. *Norfolk* (Fowler)
- Myrmetes piceus*, Payk. Burrell's list. *Norwich* (Fowler)
- Gnathoncus nannetensis*, Mars. *Norfolk* (Norgate); *Cromer*, 1889 (Walker)
- *punctulatus*, Thoms. Near *Norwich* (Dossetor)
- Saprinus nitidulus*, Payk.
- *æneus*, F. *Thorpe Hamlet*; *Waxham* (Champion)
- *immundus*, Gyll. *Hunstanton* (Fowler)
- *viescens*, Payk. *Norwich* (Fowler); *Forncett* (Brown)
- *metallicus*, Hbst.
- *rugifrons*, Payk. *Yarmouth*; *Hunstanton* (Fowler); *Waxham* (Champion)
- *maritimus*, Steph.
- Teretritus picipes*, F. Near *Norwich* (Paul *fide* Stephens)
- Abræus globosus*, Hoff. Burrell's list
- Acritus minutus*, Hbst.
- Onthophilus sulcatus*, F. *Mousehold Heath*; *Roudham Heath*, May, 1893 (Thouless); *Great Witchingham Heath* (Curtis); also in Burrell's list

A HISTORY OF NORFOLK

Onthophilus striatus, F. *Norwich; Norfolk Marshes* (Curtis)

SCAPHIDIIDÆ

Scaphidium quadrimaculatum, Ol. *Norfolk* (J. Hooker *vide* Burrell)
Scaphisoma agaricinum, L. *Foxley Wood*, August, 1888
 — *boleti*, Panz. *Hunstanton* (Fowler)

TRICHOPTERYGIDÆ

Ptinella denticollis, Fairm.
Trichopteryx atomaria, De G.
 — *grandicollis*, Mann.
 — *lata*, Mots.
 — *fascicularis*, Hbst.
 — *sericans*, Heer.
 — *bovina*, Mots.
 — *kirbyi*, Matth. *Ranworth*, April, 1863 (Matthews)
 — *longula*, Matth.
 — *montandonii*, All. } *Hunstanton*
 — *guerinii*, All. } (Fowler)
Smicrus filicornis, Fairm. *Hunstanton* (Fowler); *Denton* (Cruttwell)
Nephanes titan, Newm.
Ptilium marginatum, Aub. *Norfolk Fens*, 1868 (Matthews)
 — *exaratum*, All.
 — *foveolatum*, All.
Nossidium pilosellum, Marsh. *Hunstanton* (Blatch)
Ptenidium nitidum, Heer.
 — *evanescens*, Marsh.
 — *atomaroides*, Mots. *Brandon* (Fowler)
 — *kraatzi*, Matth. *Dunston Common*, July, 1883

CORYLOPHIDÆ

Orthoperus kluki, Wank.
 — *atomus*, Gyll.
Corylophus cassidioides, Marsh. *Horning* (Elliman); *Gimingham* (Butler)
Sericoderus lateralis, Gyll.

COCCINELLIDÆ

Subcoccinella 24-punctata, L. *Whitwell Common*, *Boston Common*
Hippodamia variegata, Goeze
Anisosticta 19-punctata, L. *Weybourne; Yarmouth* (Fowler)
Adalia oblitera, L.
 — *bipunctata*, L.
Mysia oblongoguttata, L.
Anatis ocellata, L.
Coccinella 10-punctata, L.
 — *hieroglyphica*, L. *Drayton, Mousehold Heath*, etc.

Coccinella 11-punctata, L.
 — *5-punctata*, L. Burrell's list.
 — *7-punctata*, L.
Halyzia 12-guttata, Poda.
 — *14-guttata*, L.
 — *18-guttata*, L.
 — *conglobata*, L.
Micraspis 16-punctata, L.
Scymnus redtenbacheri, Muls. *Gimingham* (Butler)
 — *frontalis*, F.
 — *suturalis*, Thunb.
 — *limbatus*, Steph. *Waxham* (Champion)
 — *hæmorrhoidalis*, Hbst. *Bixley Wood*
 — *capitatus*, F.
Chilocoris similis, Rossi.
 — *bipustulatus*, L.
Exochromus quadripustulatus, L. *Ringland*
Rhizobius litura, F.
Coccidula rufa, Hbst.
 — *scutellata*, Hbst. *Weybourne; Horning* (Fowler)

ENDOMYCHIDÆ

Mycetæa hirta, Marsh. *Mousehold Heath*
Lycoperdina bovistæ, F. Burrell's list
Endomychus coccineus, L. *Norfolk* (Skrimshire *vide* Burrell)

EROTYLIDÆ

Dacne humeralis, F.
 — *rufifrons*, F.
Triplax russica, L. *Harford Bridges*, February, 1891 (Beaumont)

PHALACRIDÆ

Phalacrus corruscus, Payk.
 — *substriatus*, Gyll. *Hunstanton* (Fowler)
 — *caricis*, Sturm.
Olibrus corticalis, Panz.
 — *æneus*, F.
 — *millefolii*, Payk. *Brandon; Horning* (Fowler)
 — *pygmæus*, Sturm. *Horning; Cromer* (Fowler)
Eustilbus testaceus, Panz.
 — *oblongus*, Er. *Horning* (Fowler)

MICROPEPLIDÆ

Micropeplus porcatus, Payk. } Burrell's list
 — *staphylinoides*, Marsh. }
 — *margaritæ*, Duv. *Ringland*, April, 1877

NITIDULIDÆ

Brachypterus gravidus, Ill.
 — *pubescens*, Er.
 — *urticæ*, F.

INSECTS

- Cercus pedicularius*, L.
 — *bipustulatus*, Payk.
 — *rufilabris*, Latr.
Epuræa decemguttata, F. *Eaton*
 — *æstiva*, L.
 — *oblonga*, Hbst. *Cromer* (Elliman)
 — *florea*, Er.
 — *deleta*, Er.
 — *pusilla*, Er.
Omosiphora limbata, F. *Ringland*, September, 1875; *Hunstanton* (Fowler)
Nitidula bipustulata, L.
 — *rufipes*, L. *Norfolk* (Stephens)
 — *quadripustulata*, F. *Ringland*; *Hunstanton* (Fowler)
Soronia grisea, L.
Omosita colon, L.
 — *discoidea*, F.
Pocadius ferrugineus, F. *Cossey Park* (Curtis)
Pria dulcamaræ, Scop.
Meligethes rufipes, Gyll.
 — *lunbaris*, Sturm.
 — *fulvipes*, Bris. *Hunstanton*, September, 1874
 — *coracinus*, Sturm. *Ringland*; *Hunstanton* (Blatch)
 — *æneus*, F.
 — *viridescens*, F.
 — *difficilis*, Heer.
 — *memnonius*, Er.
 — *brunnicornis*, Sturm.
 — *bidens*, Bris. *Whitlingham*.
 — *ovatus*, Sturm. *Horning* (Elliman)
 — *picipes*, Sturm.
 — *serripes*, Gyll. *Brandon*; *Cromer* (Fowler)
 — *murinus*, Er.
 — *obscurus*, Er. *Cromer* (Elliman)
Cychramus luteus, F.
Cryptarcha strigata, F. *Cossey*, April, 1874
 — *imperialis*, F. *Fornett* (Brown)
Ips quadripustulata, L. *Norfolk* (Skrimshire *vide* Burrell)
Pityophagus ferrugineus, F. *Norfolk* (Stephens)

COLYDIIDÆ

- Orthocerus muticus*, L. Burrell's list.
Winterton (Wood); *Yarmouth* (Paget)
Synchita juglandis, F. *Tetford* (Crotch)
Cerylon ferrugineum, Steph. *Stratton Strawless*, June, 1884

CUCUJIDÆ

- Rhizophagus cribratus*, Gyll. *Earlham*
 — *depressus*, F.
 — *parallelocollis*, Er. *Waxham* (Champion)

- Rhizophagus dispar*, Gyll. Burrell's list
 — *bipustulatus*, F.
Pediacus dermestoides, F. *Cromer* (Elliman)
Læmophloeus ferrugineus, Steph. *Norwich* (Fowler)
 — *ater*, Ol. *Norfolk* (Stephens)
Psammœchus bipunctatus, F.
Hypocopus latridioides, Mots. *Brandon* (Crotch)
Nausibius dentatus, Marsh. *Norwich*
Silvanus surinamensis, L. *Yarmouth* (Paget)

MONOTOMIDÆ

- Monotoma brevicollis*, Aub.
 — *picipes*, Hbst.
 — *quadricollis*, Aub.
 — *rufa*, Redt.

LATHRIDIIDÆ

- Holoparamesus depressus*, Curt. *Norfolk* (Fowler)
Lathridius lardarius, De G.
 — *angulatus*, Humm. *Trowse*
Coninomus nodifer, Westw.
Enicmus minutus, L.
 — *transversus*, Ol.
 — *testaceus*, Steph.
Cartodere ruficollis, Marsh.
Corticaria pubescens, Gyll.
 — *crenulata*, Gyll.
 — *denticulata*, Gyll.
 — *fulva*, Com.
 — *elongata*, Humm.
Melanophthalma gibbosa, Hbst.
 — *fuscata*, Humm.

CRYPTOPHAGIDÆ

- Telmatophilus sparganii*, Ahr. *Horning* (Sharp)
 — *caricis*, Ol.
 — *typhæ*, Fall. *Cromer* (Fowler); *Waxham* (Champion)
 — *schönherri*, Gyll. *Arminghall*; *Horning* (Fowler)
Antherophagus nigricornis, F. *Brandon* (Fowler)
 — *pallens*, Gyll. *Dunston Common*, *Kettering Common*
 — *silaceus*, Hbst. *Hunstanton* (Fowler)
Cryptophagus lycoperdi, Hbst.
 — *pilosus*, Gyll.
 — *populi*, Payk. *Near Norwich* (Stephens)
 — *dentatus*, Hbst. *Gimingham* (Butler)
 — *acutangulus*, Gyll.
 — *cellaris*, Scop.
 — *affinis*, Sturm. *Cromer* (Walker)
Micrambe vini, Panz.
Paramecosoma melanocephalum, Hbst. *Cromer* (Fowler)

A HISTORY OF NORFOLK

Atomaria barani, Bris.
 — *nigriventris*, Steph.
 — *umbrina*, Er.
 — *linearis*, Steph.
 — *elongatula*, Er. *Norwich*, July, 1875
 — *fuscipes*, Gyll. *Cley, Aylsham* (Wood)
 — *munda*, Er.
 — *fuscata*, Schön.
 — *pusilla*, Payk.
 — *atricapilla*, Steph.
 — *basalis*, Er. *Woodbastwick* (Fowler);
 Aylsham (Wood)
 — *rhenana*, Kr. *Yarmouth* (Rye)
 — *mesomelas*, Hbst. *Ringland*, May,
 1876
 — *gutta*, Steph. *Horning* (Elliman)
 — *apicalis*, Er.
 — *anal*, Er.
 — *ruficornis*, Marsh.
Ephistemus globosus, Walth. Near *Nor-*
 wich (Dossetor)

MYCETOPHAGIDÆ

Typhæa fumata, L.
Triphyllus punctatus, F. *Arminghall*;
 Forngett (Brown)
Litargus bifasciatus, F. *Cromer* (Elliman)
Mycetophagus quadripustulatus, L.
 — *piceus*, F. *Norfolk* (Fowler)
 — *populi*, F. *Harleston* (Fox)
 — *multipunctatus*, Hellw. Burrell's list;
 Forngett (Brown)

BYTURIDÆ

Byturus sambuci, Scop.
 — *tomentosus*, F.

DERMESTIDÆ

Dermestes murinus, L.
 — *undulatus*, Brahm. *Blakeney*
 — *lardarius*, L.
Attagenus pellio, L.
Tiresias serra, F. Burrell's list
Anthrenus musæorum, L.
 — *claviger*, Er.

BYRRHIDÆ

Syncalypta spinosa, Rossi. } *Norfolk*
 } (Fowler)
 — *hirsuta*, Shp.
Byrrhus pilula, L.
 — *fasciatus*, F.
 — *dorsalis*, F.
 — *murinus*, F. *Mousehold Heath*
Cytilus varius, F. *Mousehold Heath*; *Wax-*
 ham (Champion); *Aylsham* (Wood)
Simplocaria semistriata, F.
Limnichus pygmæus, Sturm. *Cromer*
 (Elliman)

Aspidiphorus orbiculatus, Gyll. *Horning*
 (Elliman)

GEORYSSIDÆ

Georyssus pygmæus, F. *Arminghall*

PARNIDÆ

Elmis æneus, Müll.
 — *volkmari*, Panz. *Ketteringham Common*
 — *cupreus*, Müll. *Whitwell Common*
Limnius tuberculatus, Müll.
 — *troglodytes*, Gyll. *Eaton*
 — sp? *Honing*
 — sp? *Colney, Horning*
Parnus prolifericornis, F.
 — *auriculatus*, Panz.
 — *algericus*, Lucas. *St. Faiths*; *Horning*
 (Power)

HETEROCERIDÆ

Heterocerus flexuosus, Steph. *Hunstanton*
 (Fowler)
 — *marginatus*, F. Burrell's list. *Yar-*
 mouth (Paget)
 — *lævigatus*, Panz. Burrell's list

LUCANIDÆ

Lucanus cervus, L. *Kirby Bedon* (Wigham)
Dorcus parallelipedus, L.
Sinodendron cylindricum, L. Burrell's
 list. *Norfolk* (Wigham)

SCARABÆIDÆ

COPRINA

Onthophagus ovatus, L. *Mousehold Heath*;
 Roudham Heath (Thouless)
 — *cœnobita*, Hbst. Burrell's list. *East*
 Carlton, July, 1874.
 — *vacca*, L. *Norfolk* (Hooker *fide* Burrell)
 — *fracticornis*, Payk.
 — *nuchicornis*, L. *Yarmouth*; *Hunstanton*
 (Fowler)
Aphodius erraticus, L.
 — *subterraneus*, L.
 — *fossor*, L.
 — *hæmorrhoidalis*, L.
 — *foetens*, F.
 — *fimetarius*, L.
 — *scybalarius*, F.
 — *ater*, De G.
 — *granarius*, L.
 — *nitidulus*, F. *Hunstanton*
 — *sordidus*, F. *Norwich*
 — *rufescens*, F. *Swanton Morley, Eaton*
 Common; *Hunstanton* (Fowler)
 — *plagiatus*, L. *Norwich* (Fowler)
 — *porcus*, F.
 — *tristis*, Panz. *Norwich*

INSECTS

COPRINA (*continued*)

- Aphodius pusillus, Hbst.
- quadrimaculatus, L. Burrell's list.
Roudham Heath, May, 1893 (Thouless)
- merdarius, F.
- inquinatus, F.
- sticticus, Panz.
- punctatosulcatus, Sturm.
- prodromus, Brahm.
- contaminatus, Hbst.
- oblitteratus, Panz.
- luridus, F.
- rufipes, L.
- depressus, Kug. *Postwick Grove*, May, 1875; *Horning* (Wigham)
- Heptaulacus sus, Hbst. *Norwich* (Fowler)
- Oxyomus porcatus, F.
- Psammobius sulcicollis, Ill. *Norfolk* (Fowler)
- Ægialia arenaria, F.
- Odontæus mobilicornis, F. Burrell's list.
Mousehold Heath (Sparshall *fide* Curtis)
- Geotrupes typhæus, L. *Mousehold Heath*,
Wretham Heath
- spiniger, Marsh.
- stercorarius, L.
- mutator, Marsh.
- sylvaticus, Panz.
- Trox sabulosus, L. Burrell's list
- scaber, L. *St. Martin's Lane*, *Norwich* (Thouless); *Brandon* (Fowler); Burrell's list

MELOLONTHINA

- Hoplia philanthus, Füss. Burrell's list.
Yarmouth (Paget); *Forncett* (Brown)
- Homalopia ruricola, F. *Norfolk* (Stephens);
Roudham Heath, May, 1893 (Thouless)
- Serica brunnea, L.
- Rhizotrogus solstitialis, L.
- Melolontha vulgaris, F.

RUTELINA

- Phyllopertha horticola, L.
- Anomala frischii, F. *Coast Sands*, also at
Brandon

CETONIINA

- Cetonia aurata, L. Formerly common
- Gnorimus nobilis, L. *Norwich Market-place* (Thouless), one example

BUPRESTIDÆ

- Agilus laticornis, Ill. *Horsford*, *Arminghall* (Thouless)
- angustulus, Ill. *Hethersett*, *Howe Grove*, *Boaton Common* (Thouless)
- viridis, L. Burrell's list
- Trachys minuta, L. *Poringland* (Wigham)
- troglodytes, Gyll. *St. Faiths* (Power)

THROSCIDÆ

- Throscus dermestoides, L.

EUCNEMIDÆ

- Melasis buprestoides, L. *Gawdy Hall Wood* (Garneys)
- Microrrhagus pygmæus, F. *Norfolk* (Wilkin *fide* Stephens)

ELATERIDÆ

- Lacon murinus, L.
- Cardiophorus asellus, Er. Near *Norwich* (Dossetor); *Westacre*, *Brandon* (Thouless)
- ruficollis, Linn. *Norfolk* (Skrimshire *fide* Burrell)
- thoracicus, Er. *Norfolk* (Hooker *fide* Burrell)
- Cryptohypnus riparius, F. *Brundall*, etc.
- quadripustulatus, F. *Norfolk* (J. Hooker *fide* Burrell)
- Elater balteatus, L. Burrell's list
- Ischnodes sanguinicollis, Panz. *Norfolk* (Stephens)
- Melanotus rufipes, Hbst.
- castanipes, Payk. *Stratton Strawless*, June, 1895 (Thouless)
- Athous niger, L.
- longicollis, Ol. *Norfolk* (Stephens)
- hæmorrhoidalis, F.
- vittatus, F. *Sprowston* (J. Hooker *fide* Burrell)
- Limonius cylindricus, Payk. *Brandon*
- minutus, L.
- Adrastus limbatus, F.
- Agriotes sputator, L.
- obscurus, L.
- lineatus, L.
- sordidus, Ill.
- pallidulus, Ill.
- Dolopius marginatus, L.
- Corymbites castaneus, L. *Mousehold Heath* (W. Hooker *fide* Stephens)
- cupreus, F. *Mousehold Heath* (Hewitson *fide* Stephens)
- tessellatus, F. *Horning* (Fowler); *Cringford* (Brown); *Waxham* (Champion)
- quercus, Gyll. *Drayton* (Thouless)
- holosericeus, F. *Mousehold Heath*; *Yarmouth* (Thouless); *Congham* (Wood)
- æneus, L. *Mousehold Heath*
- metallicus, Payk. *Foxley Wood* (Thouless)
- bipustulatus, L. Burrell's list
- Campylus linearis, L.

A HISTORY OF NORFOLK

DASCILLIDÆ

- Dascillus cervinus*, L. Burrell's list
Helodes minuta, L.
Microcara livida, F.
Cyphon coarctatus, Payk. *Wacton*, August, 1883
— *nitidulus*, Thoms.
— *variabilis*, Thunb.
— *pallidulus*, Boh. *Framingham Pigot*, May, 1876
— *padi*, L. *Horning*, etc.
Prionocyphon sericornis, Müll. *Chapel Field Gardens, Norwich*, July, 1894 (Thouless)
Scirtes hemisphæricus, L.
— *orbicularis*, Panz. *Brundall*, July, 1885
Eubria palustris, Germ. *Whitwell Common*, June, 1895 (Thouless)

MALACODERMIDÆ

LYCINA

- Platycis minutus*, F. *Norfolk* (Stephens)

LAMPYRINA

- Lampyris noctiluca*, L.

TELEPHORINA

- Silis ruficollis*, F. *Horning*, etc.; *Brandon* (Fowler)
Telephorus fuscus, L.
— *rusticus*, Fall.
— *lividus*, L.
— *pellucidus*, F.
— *nigricans*, Müll.
— " var. *discoideus*, Steph. *Sparham* (Norgate); *Eaton* (Brown)
— *litratus*, F. *Hellesdon, Morston; Waxham* (Champion)
— *figuratus*, Mann. *Horning*
— *bicolor*, F.
— *hæmorrhoidalis*, F. *Ketteringham*
— *oralis*, Germ. *Howe Grove, Cley; Waxham* (Champion)
— *flavilabris*, Fall. *Cley; Horning* (Brown); *Waxham* (Champion)
— *thoracicus*, Ol. *Ranworth, Poringland, Eaton Common; Aysbam; (Wood)*
Rhagonycha fuscicornis, Ol. *Horning*, July 2, 1835 (Brown)
— *fulva*, Scop.
— *testacea*, L.
— *limbata*, Thoms.
— *pallida*, F.
Malthinus punctatus, Fourc.
— *fasciatus*, Ol. *Dunston, Cossey; Hunstanton* (Fowler)
— *balteatus*, Suff. *Dunston; Hunstanton* (Fowler)
— *frontalis*, Marsh. *Hethersett*, August, 1879; *Hunstanton* (Fowler)
Malthodes marginatus, Latr.

TELEPHORINA (continued)

- Malthodes flavoguttatus*, Kies. *Aylsham* (Wood)
— *dispar*, Germ.
— *minimus*, L.
— *nigellus*, Kies. Near *Norwich* (Dossator)

MELYRINA

- Malachius æneus*, L. Burrell's list; *Long Stratton* (Brown)
— *bipustulatus*, L.
— *marginellus*, Ol. *Norfolk* (Stephens)
Axinotarsus ruficollis, Ol. *Dunston Common* (Thouless); *Horning* (Brown); *Brandon* (Fowler)
Anthocomus rufus, Hbst. *Horning; Oby* (Paget)
— *fasciatus*, L.
— *terminatus*, Mén. *Horning, Ranworth*
Dasytes flavipes, F.
— *ærosus*, Kies.
Psilothrix nobilis, Ill. Near *Norwich* (Dossator); *Harford Bridges* (Thouless)

CLERIDÆ

- Tillus elongatus*, L. *Harleston district* (Fox)
Thanasimus formicarius, L. Burrell's list
Trichodes apiarius, L. *Norfolk* (Stephens)
Necrobia ruficollis, F.
— *violacea*, L.
Corynetes cæruleus, De G.

PTINIDÆ

PTININA

- Ptinus germanus*, F. *Norfolk* (Fowler)
— *lichenum*, Marsh.
— *fur*, L.
Niptus hololeucus, Fald.
Hedobia imperialis, L.

ANOBIINA

- Dryophilus pusillus*, Gyll. *Earlham, Foxley Wood, Ringstead Downs; Brandon* (Fowler)
Priobium castaneum, F.
Anobium domesticum, Fourc.
— *paniceum*, L. *Yarmouth* (Paget)
Xestobium tessellatum, F.
Ernobius mollis, L. *Thorpe*, June, 1874
Ptilinus pectinicornis, L. *Swardston Common; Yarmouth* (Paget)
Ochina hederæ, Müll.
Cænocara bovistæ, Hoff. *Norwich; Horning, Ashwicken* (Power)
Dorcatoma chrysomelina, Sturm. *Denton* (Cruttwell)

BOSTRICHIDÆ

- Bostrichus capucinus*, L. Near *Cromer* (Stephens)

INSECTS

LYCTIDÆ

Lycus canaliculatus, F. *Earlham*, July, 1885; *Wroxham* (Fowler)

CISSIDÆ

Cis boleti, Scop.
— *bidentatus*, Ol. *Harleston district* (Fox); *Horning* (Elliman)
— *nitidus*, Hbst. *Sparham* (Norgate)
— *festivus*, Panz.
Octotemnus glabriculus, Gyll. *Cromer* (Elliman)

CERAMBYCIDÆ

PRIONINA

Prionus coriarius, L.

CERAMBYCINA

Aromia moschata, L. *Norwich* (Thouless); *Sparham district* (Norgate); *Oby* (Paget)
Hylotrupes bajulus, L. *Cromer* (Lewcock *vide* Donisthorpe)
Callidium violaceum, L. *Norfolk* (Stephens); *Norwich* (Thouless)
— *variabile*, L. *Norwich* (Thouless)
Clytus arcuatus, L. Burrell's list
— *arietis*, L.
Gracilia minuta, F. *Norwich*; *Sparham* (Norgate); *Yarmouth* (Paget)
Molorchus minor, L. *Westacre*, 1900 (Thouless)
Rhagium inquisitor, F. Burrell's list. *Horning* (Wigham)
— *indagator*, Gyll. *Edgefield Wood* (Wigham)
— *bifasciatum*, F. *Brundall*; *Horsford* (Thouless)
Toxotus meridianus, Panz. *Arminghall*; *Sparham district* (Norgate); *Hellesdon* (Thouless)
Leptura sanguinolenta, L. *Norfolk Fens* (Winter *vide* Waterhouse)
— *livida*, F.
Strangalia quadrifasciata, L. *Ranworth*; *Horning* (Wigham); *Oby* (Paget)
— *armata*, Hbst.
— *nigra*, L. *Norfolk* (Fowler)
— *melanura*, L. *Foxley Wood*
Grammoptera tabacicolor, Dej. *Brandon* (Thouless)
— *ruficornis*, F.

LAMIINA

Acanthocinus ædilis, L. *Norwich*
Leiopus nebulosus, L. *Foxley Wood, Howe Grove, Booton Common* (Thouless); *Aylsham* (Wood)
Pogonochærus fasciculatus, De G. Near *Norwich* (Stephens)

LAMIINA (continued)

Pogonochærus bidentatus, Thoms. *Gimingham* (Butler)
— *dentatus*, Fourc.
Monochammus sartor, F. *Norfolk* (Stephens)
— *sutor*, L. *Norwich* (Stephens)
Agapanthia lineatocollis, Don. *Norfolk* (Stephens); *Oby* (Paget)
Saperda carcharias, L.
— *populnea*, L. *Foxley Wood*
Tetrops præusta, L. *Postwick Grove, Ringland*; *Norwich* (Thouless)
Phytœcia cylindrica, L. *Ketteringham*; *Eaton, Gawdy Wood* (Brown); near *Norwich* (Bridgman); *Yarmouth* (Paget)
Oberea oculata, L. *Downham*, 1888 (Norgate)

BRUCHIDÆ

Bruchus cisti, F. Near *Norwich* (Dossator)
— *pisi*, L.
— *rufimanus*, Boh.
— *atomarius*, L. *East Rudham* (Wood)
— *loti*, Payk. *Swanton Morley*; *Rudham* (Fowler)
— *villosus*, F. *Eaton, St. Faiths*; *Rudham* (Fowler); *Aylsham, Potter Heigham* (Wood)

CHRYSOMELIDÆ

EUPODA

Donacia crassipes, F. *Ranworth*
— *dentata*, Hoppe. *Lakenham*
— *versicolore*, Brahm. *Hickling Broad*; *Booton Common, Horning* (Thouless); *Aylsham* (Fowler)
— *sparganii*, Ahr.
— *dentipes*, F.
— *limbata*, Panz.
— *bicolora*, Zsch. *Harford Bridges, May*, 1875; *Horning* (Thouless)
— *thalassina*, Germ. *Lakenham, Arminghall*; *Brundall* (Thouless)
— *impressa*, Payk. *Ranworth, Lakenham*; *Horning* (Thouless)
— *simplex*, F.
— *vulgaris*, Zsch. *Arminghall*; *Cringieford, Fornett* (Brown); *Harford Bridges* (Thouless)
— *clavipes*, F.
— *semicuprea*, Panz.
— *cinerea*, Hbst. *Ranworth*
— *sericea*, L.
— *discolor*, Panz. *Whitwell Common*
— *braccata*, Scop. *Horning, Ranworth*; *Surlingham* (Thouless)
— *affinis*, Kunze. *Ranworth* (Thouless)

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EUPODA (*continued*)

- Hæmonia curtisi*, Lac. Near *Fakenham*
(*Skrimshire fide Stephens*), *Cley*
(*Babington fide Sharp*)
Zeugophora subspinosæ, F.
Lema cyanella, L.
— *lichenis*, Voet.
— *melanopa*, L.
Crioceris asparagi, L.

CAMPTOSOMATA

- Cryptocephalus coryli*, L. } *Edgefield Wood*
— *lineola*, F. } (*Burrell*)
— *aureolus*, Suffr. } *Burrell's list*
— *moræi*, L. }
— *bilineatus*, L. *Norfolk* (*Fowler*)
— *fulvus*, Goeze. *Mousehold Heath*
— *pusillus*, F. *Sprowston*, *Foxley Wood*
— *labiatus*, L.
— *exiguus*, Schneid. *Eaton Common*, Au-
gust, 1888 ; *Horning* (*Thouless*) ;
Woodbastwick (*Power*)
— *frontalis*, Marsh. *Foxley Wood*, July,
1885

CYCLICA

- Lamprosoma concolor*, Sturm. *Norfolk*
(*Stephens*)
Timarcha tenebricosa, Fab.
— *violaceonigra*, De G.
Chrysomela marginalis, Duft.
— *banksi*, F. *Kirby Bedon*
— *staphylea*, L.
— *polita*, L.
— *orichalcia*, Müll. *Lakenham*, June, 1883
— *hæmoptera*, L. *Weybourne*, Oct., 1890
— *varians*, Schall. *Foxley Wood*, Septem-
ber, 1891
— *goettingensis*, L. *Burrell's list*. *Work-*
house Lane, *Norwich*, April, 1880
— *graminis*, L. *Burrell's list*
— *menthrasti*, Suffr. *Norfolk* (*Stephens*)
— *fastuosa*, Scop. *Burrell's list*
— *didymata*, Scrib.
— *hyperici*, Forst.
Melasoma populi, L. *Ranworth* ; *Horning*
(*Thouless*) ; *Oby* (*Paget*)
— *longicollæ*, Suffr. *Burrell's list*
Phytodecta rufipes, De G. } *Brandon*
— *viminalis*, L. } (*Fowler*)
— *olivacea*, Forst.
— *affinis*, Suffr. *Norfolk Fens* (*Winter*
fide Waterhouse)
Gastroidea viridula, De G.
— *polygoni*, L.
Phædon tumidulus, Germ.
— *armoraciæ*, L.
— *cochleariæ*, F.
Phyllodecta vulgatissima, L.
— *cavifrons*, Thoms.
— *vitellinæ*, L.
Hydrothassa aucta, F. *Burrell's list*

CYCLICA (*continued*)

- Hydrothassa marginella*, L.
Prasocuris junci, Brahm.
— *phellandrii*, L.
Phyllobrotica quadrimaculata, L. *Horning*,
Brundall ; *Surlingham* (*Thouless*) ;
Oby (*Paget*)
Luperus nigrofasciatus, Goeze. *Mousehold*
Heath
— *rufipes*, Scop. *Stratton Strawless* (*Thou-*
less)
— *flavipes*, L.
Lochmæa caprææ, L. *Stratton Strawless*,
etc. ; *Potter Heigham* (*Wood*)
— *suturalis*, Thoms. *Mousehold Heath*
— *cratægi*, Forst.
Galerucella viburni, Payk. *Foxley Wood*,
Howe Grove
— *nymphææ*, L. *Horning*, etc.
— *sagittariæ*, Gyll.
— *lineola*, F.
— *calmariensis*, L.
— *tenella*, L.
Adimonia tanaceti, L.
Sermyla halensis, L.
Longitarsus anchusæ, Payk. *East Rudham*
(*Wood*)
— *ater*, F. *Caistor*, *Norwich* ; *Ditchingham*,
Ashwicken (*Power*)
— *holsaticus*, L. *Horning*, etc.
— *quadriguttatus*, Pont. *Burrell's list*
— *castaneus*, Duft.
— *luridus*, Scop.
— *brunneus*, Duft.
— *fuscollis*, Steph.
— *atricillus*, L.
— *melanocephalus*, All.
— *nasturtii*, F. *Norwich District* ; *Ditch-*
ingham (*Power*)
— *ballotæ*, Marsh.
— *flavicornis*, Steph. } *Ditchingham*
— *femoralis*, Marsh. } (*Power*)
— *pusillus*, Gyll. *Aylsham*, *Hunstanton*
(*Fowler*)
— *tabidus*, F.
— *jacobææ*, Wat.
— *rutilus*, Ill. *Eaton*, August, 1875
— *ochroleucus*, Marsh.
— *gracilis*, Kuts.
— *lævis*, Duft. *Gimingham* (*Butler*)
— *pellucidus*, Foudr. *Ditchingham* (*Power*) ;
Hunstanton (*Fowler*)
Haltica lythri, Aub.
— *ericeti*, All. *Mousehold Heath*, *Roud-*
ham Heath
— *coryli*, Brit. Coll. *Foxley Wood*
— *oleraceæ*, L.
— *palustris*, Weise. *Whitwell Common*, etc.
Phyllotreta nodicornis, Marsh. *Norwich* ;
Aylsham (*Wood*)

INSECTS

CYCLICA (continued)

- Phyllotreta consobrina*, Curt. *Norfolk*
(Fowler)
— *punctulata*, Marsh. *Ditchingham*
(Power)
— *atra*, Payk.
— *cruciferae*, Goeze
— *vittula*, Redt.
— *undulata*, Ruts.
— *memorum*, L.
— *ochripes*, Curt.
— *sinuata*, Steph.
— *tetrastigma*, Com.
— *exclamationis*, Thunb.
Aphthona lutescens, Gyll. *Ranworth*,
Horning, etc.
— *nonstriata*, Goeze.
— *venustula*, Kuts. *Ringland*
— *atrocerulea*, Steph. *Bixley*, June,
1875
— *virescens*, Foudr. *Ditchingham* (Power);
Hunstanton (Fowler)
Batophila rubi, Payk. *Ketteringham*
— *aerata*, Marsh.
Sphaeroderma testaceum, F.
— *cardui*, Gyll.
Apteropoda orbiculata, Marsh.
— *globosa*, Ill. } *Hunstanton* (Blatch)
— *splendida*, All. }
Podagrica fuscicornis, L.
Mantura rustica, L. *Framingham Earl*,
June, 1878
— *obtusata*, Gyll.
Ochrosis salicariae, Payk.
Crepidodera transversa, Marsh.
— *ferruginea*, Scop.
— *rufipes*, L.
— *ventralis*, Ill. *St. Faiths* (Fowler)
— *nitidula*, L. Burrell's list
— *chloris*, Foudr. *Thorpe*, July, 1874
— *aurata*, Marsh.
Hippuriphila modeeri, L.
Chaetocnema hortensis, Fourc.
— *sahlbergi*, Gyll. *Honing Common*, July,
1887
Plectoscelis concinna, Marsh.
Psylliodes chrysocephala, L.
— *napi*, Koch.
— *cuprea*, Koch. *Arminghall*, September,
1877
— *affinis*, Payk.
— *marcida*, Ill.
— *dulcamarae*, Koch. *Hickling*; *Horning*
(Fowler)
— *chalconera*, Ill. *Hunstanton* (Fowler)
— *hyoscyami*, L. Burrell's list
— *picina*, Marsh. *Brundall*, April, 1886

CRYPTOSOMATA

- Cassida murræa*, L. *St. Faiths Wood*
(Wigham)

CRYPTOSOMATA (continued)

- Cassida nebulosa*, L. *Ludham, Woodbast-*
wick (Thouless)
— *vibex*, F. *Stoke Holy Cross* (Thouless);
Ditchingham (Fowler)
— *sanguinolenta*, F. *Heigham Osier Carr*,
June, 1877; *Mousehold Heath*
(Thouless)
— *vittata*, Vill. *Norfolk* (Skrimshire)
— *nobilis*, L. *Norfolk* (Burrell)
— *flaveola*, Thunb. *Dunston, Mousehold*
Heath; *Aylsham* (Wood)
— *equestris*, F.
— *viridis*, F.

TENEBRIONIDÆ

- Blaps mucronata*, Latr.
Crypticus quisquilius, L. *Sandy coast*, also
Brandon
Heliopathes gibbus, F. *Yarmouth*, etc.
Microzoum tibiale, F. *Sandy coast*, also
Brandon
Phaleria cadaverina, F. *Yarmouth*; *Hun-*
stanton (Fowler)
Heledona agricola, F. *Norfolk* (Fowler)
Scaphidema metallicum, F. *Arminghall*
Tenebrio molitor, L.
— *obscurus*, F.
Gnathocerus cornutus, F. *Norwich* (Fowler)
Tribolium ferrugineum, F. } *Norfolk*
Hypophlœus bicolor, Ol. } (Fowler)
Helops cœruleus, L. *Lower Close, Norwich*;
Yarmouth (Paget)
— *striatus*, Fourc. *Sparham district* (Nor-
gate); *Horsford* (Thouless)

CISTELIDÆ

- Cistela luperus*, Hbst.
— *murina*, L.
Eryx ater, F. *Norwich* (Fowler)
Cteniopus sulphureus, L.

LAGRIIDÆ

- Lagria hirta*, L.

MELANDRYIDÆ

- Tetratoma fungorum*, F. *Whitlingham*
(Wigham); *Fornett* (Brown)
— *desmaresti*, Latr. *Harleston district* (Fox)
Orchesia micans, Panz. *Fornett*, - *Broome*
(Brown)
Hallomenus humeralis, Panz. *Lakenham*
Conopalpus testaceus, Ol. *Dunston Common*,
July, 1883
Melandrya caraboides, L. Burrell's list.
Yarmouth (Paget)

PYTHIDÆ

- Salpingus castaneus*, Panz. *Stratton Straw-*
less, etc.

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Salpingus æratus, Müll. *Norwich*
Rhinosimus ruficollis, L.
 — *viridipennis*, Steph.
 — *planirostris*, F.

OEDEMERIDÆ

Oedemera nobilis, Scop. *Postwick* (Dossator)
 — *lurida*, Marsh.
Oncomera femorata, F. *Starston* (Paul fide Burrell)
Nacerdes melanura, Schmidt. *Mousehold Heath* ; *Yarmouth* (Paget)
Ischnomera cœrulea, L. *Eaton*, Kirby (Brown) ; *Yarmouth* (Paget)

PYROCHROIDÆ

Pyrochroa serraticornis, Scop.

MORDELLIDÆ

Mordellistena brunnea, F. *Hellesdon* ; *Bircham Newton* (Fowler)
 — *pumila*, Gyll. *Horning* ; *Aylsham* (Wood)
 — *parvula*, Gyll. ; var. *inæqualis*, Muls. *Hellesdon*
Anaspis frontalis, L.
 — *pulicaria*, Costa
 — *geoffroyi*, Müll.
 — *ruficollis*, F.
 — *subtestacea*, Steph.
 — *maculata*, Fourc.

RHIPIDOPHORIDÆ

Meteocus paradoxus, L. Burrell's list.
Cossey (Wigham)

ANTHICIDÆ

Notoxus monoceros, L.
Anthicus floralis, L.
 — *antherinus*, L. *Yarmouth* (Thouless)

XYLOPHILIDÆ

Xylophilus populneus, F. *Heigham*
 — *oculatus*, Gyll. *Dunston Common*

MELOIDÆ

Meloe proscarabæus, L.
 — *violaceus*, Marsh. *Reepham* (Thouless)
Lytta vesicatoria, L. *Norwich*, 1877.
 Once taken by William Hooker and once by Skrimshire (fide Burrell)

ANTHRIBIDÆ

Brachytarsus fasciatus, Forst. *Norfolk*
 (Hooker fide Burrell)
Anthribus albinus, L. } *Norfolk*
Platyrhinus latirostris, F. } (Stephens)

Tropideres albirostris, Hbst. Near *Norwich*
 (Stephens)
 — *niveirostris*, F. *Norfolk* (Stephens)
Choragus sheppardi, Kirby. *Fornsett* (?)
 (Brown)

CURCULIONIDÆ

ATTELABINA

Apoderus coryli, L. } *Foxley*
Attelabus curculionoides, L. } *Wood*

RHYNCHITINA

Byctiscus betuleti, F. } *Foxley Wood*
 — *populi*, L. }
Rhynchites cupreus, L. Burrell's list
 — *æquatus*, L.
 — *æneovirens*, Marsh. Burrell's list
 — *cœruleus*, De G.
 — *minutus*, Hbst.
 — *nanus*, Payk. Burrell's list ; *Cawston Heath* (Wood)
 — *uncinatus*, Thoms. *Horning* (Elliman)
 — *pubescens*, F. *Foxley Wood*
Deporaus betulæ, L. *Foxley Wood*, *Brooke Wood*, etc.

APIONINA

Apion pomonæ, F.
 — *craccæ*, L. } *Norfolk* (Fowler)
 — *subulatum*, Kirby }
 — *ulicis*, Forst.
 — *malvæ*, F.
 — *urticarium*, Hbst.
 — *miniaturum*, Germ.
 — *hæmatodes*, Kirby
 — *rubens*, Steph.
 — *pallipes*, Kirby. *Ditchingham* (Fowler)
 — *rufirostre*, F.
 — *viciæ*, Payk. *Waxham* (Champion)
 — *difforme*, Germ.
 — *varipes*, Germ.
 — *apricans*, Hbst.
 — *bohemani*, Thoms. *Yarmouth*
 — *trifolii*, L.
 — *dichroum*, Bedel
 — *nigritarse*, Kirby
 — *confluens*, Kirby
 — *hookeri*, Kirby. *Waxham* (Champion)
 — *æneum*, F.
 — *radiolus*, Kirby
 — *onopordi*, Kirby
 — *carduorum*, Kirby
 — *flavimanum*, Gyll.
 — *virens*, Hbst.
 — *punctigerum*, Payk.
 — *pisi*, F.
 — *æthiops*, Hbst.
 — *ebeninum*, Kirby. *Ashwicken* (Fowler)
 — *striatum*, Kirby
 — *immune*, Kirby. *Thorpe*, Oct., 1875
 — *ononis*, Kirby

INSECTS

APIONINA (*continued*)

- Apion spencei, Kirby
- ervi, Kirby
- vorax, Hbst. *Aylsham* (Wood)
- gyllenhali, Kirby. *Gimingham* (Butler)
- meliloti, Kirby. *Ditchingham* (Fowler)
- scutellare, Kirby
- loti, Kirby
- seniculum, Kirby
- tenue, Kirby
- simile, Kirby. *Hunstanton* (Fowler)
- curtisi, Walt. *Norfolk* (Fowler)
- limonii, Kirby
- marchicum, Hbst. *Waxham* (Champion)
- violaceum, Kirby
- hydrolapathi, Kirby
- humile, Germ.

OTIORRHYNCHINA

- Otiorrhynchus raucus, F. *Cromer* (Fowler); *Roughton*, August, 1900 (Beare)
- scabrosus, Marsh.
- picipes, F.
- sulcatus, F.
- ligustici, L. *Burrell's list*
- ovatus, L.
- muscorum, Bris. *Hellesdon*
- Trachyphloeus aristatus, Gyll. *Gimingham* (Butler)
- squamulatus, Ol. *Ringland*, Sept., 1876
- scaber, L.
- scabriculus, L.
- spinimanus, Germ. *Cromer* (Walton)
- Cænopsis fissirostris, Walt. } *Mousehold*
- waltoni, Schön. } *Heath*
- Strophosomus coryli, F.
- capitatus, De G.
- retusus, F.
- faber, Hbst. } *Mousehold Heath*
- lateralis, Payk. }
- Brachysomus echinatus, Bonsd.
- Sciaphilus muricatus, F.
- Tropiphorus carinatus, Müll. *Norfolk* (Burrell)
- Barypeithes sulcifrons, Boh. *Sparham district* (Norgate)
- Liophloeus nubilus, F.
- Polydrusus micans, F. *Foxley Wood*
- tereticollis, De G. *Burrell's list*
- pterygomalis, Boh.
- flavipes, De G. *Brooke Wood, Ketteringham Common*
- cervinus, L.
- chrysomela, Ol. *Wells, Brancaster*
- confluens, Steph. *Brandon* (Fowler)
- Phyllobius oblongus, L.
- urticae, De G.
- pyri, L.
- argentatus, L.
- maculicornis, Germ.

OTIORRHYNCHINA (*continued*)

- Phyllobius pomonæ, Ol.
 - viridiæris, Laich.
 - viridicollis, F. *Brandon*, May, 1888; *Yarmouth* (Fowler)
 - Tanymecus palliatus, F. *Cromer* (Fowler); *Waxham* (Champion)
 - Philopodon geminatus, F. *Yarmouth*; *Waxham* (Champion)
 - Atactogenus exaratus, Marsh. *Mousehold Heath*
 - Barynotus obscurus, F. *Hellesdon*, May, 1879; *Gaistor* (Paget)
 - elevatus, Marsh. *Aylsham* (Fowler)
 - Alophus triguttatus, F. *Burrell's list*
- ### CURCULIONINA
- Sitones griseus, F.
 - regensteiniensis, Hbst.
 - crinitus, Hbst.
 - tibialis, Hbst.
 - hispidulus, F.
 - humeralis, Steph.
 - flavescens, Marsh. *Gimingham* (Butler); *Horning* (Bedwell)
 - puncticollis, Steph.
 - suturalis, Steph. *Gimingham* (Butler)
 - lineatus, L.
 - sulcifrons, Thunb.
 - Gronops lunatus, L. *Mousehold Heath*
 - Hypera punctata, F.
 - fasciculata, Hbst. }
 - arundinis, Payk. } *Norfolk* (Stephens)
 - pollux, F. *Heigham Osier Carr*, May, 1875; *Aylsham* (Wood)
 - alternans, Steph. *Rudham* (Fowler); *Waxham* (Champion)
 - polygoni, L. *Felbrigg*, August, 1883
 - suspiciosa, Hbst. *Hellesdon*, July, 1874
 - variabilis, Hbst.
 - plantaginis, De G. *Fornsett*
 - meles, F. *Yarmouth, Foxley Wood*
 - nigrirostris, F.
 - Cleonus sulcirostris, L. *Mousehold Heath, Holkham; Yarmouth* (Fowler)
 - albidus, F. *Hellesdon* (Hooker *vide* Stephens); *Thetford*, before 1837 (Salmon)
 - nebulosus, L. *Burrell's list. Mousehold Heath*
 - Lixus paraplecticus, L. *Halvergate* (Stephens); *Horning* (Thouless)
 - Liosoma ovatum, Clairv.
 - Liparus coronatus, Goeze. *Burrell's list*
 - Hylobius abietis, L. *Stratton Strawless; Sparham district* (Norgate); *Arminghall Wood* (Wigham)
 - Pissodes notatus, F. *Yaxham* (Wollaston *vide* Walton)
 - Orchestes quercus, L.

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CURCULIONINA (*continued*)

- Orchestes scutellaris, Gyll. *Drayton Drew-ray*, June, 1889; *Norfolk* (Smith)
 —alni, L.
 — „ var. ferrugineus, Marsh.
 —ilicis, F.
 —avellanæ, Don.
 —fagi, L.
 —rusci, Hbst. *Brandon*, July, 1882
 —stigma, Germ. *Foxley Wood*
 —salicis, L.
 —saliceti, Payk. *Norfolk* (Stephens)
 Ramphus flavicornis, Clairv.
 Orthocætes setiger, Beck. *Mousehold Heath*; *Yelverton* (Brown)
 Procas armillatus, F. *Norfolk* (Stephens)
 Grypidius equiseti, F. *Cringleford* (Brown); *Aylsham* (Wood)
 Erirrhinus bimaculatus, F. *Norfolk* (Fowler)
 —acridulus, L.
 Thryogenes festucae, Hbst. *Horning*, etc.
 —nereis, Payk. *Horning* (Fowler)
 Dorytomus vorax, F.
 —tortrix, L. *Lakenham*
 —hirtipennis, Bedel. *Thorpe*, Sept., 1876
 —maculatus, Marsh.
 —costirostris, Gyll. *Stoke Holy Cross*
 —agnathus, Boh. *Cromer* (Fowler)
 —pectoralis, Gyll.
 —salicinus, Gyll. *Horning*, May, 1889; *Hoveton* (Power)
 Smicronyx jungermanniæ, Reich. *St. Faiths* (Power)
 Tanysphyrus lemnæ, F.
 Bagous alismatis, Marsh.
 —petro, Hbst. *Brandon*, *St. Faiths Common*
 —binodulus, Hbst. *Near Norwich* (Stephens)
 —tempestivus, Hbst.
 —lutosus, Gyll. *Norfolk* (Stephens); *Wretham Heath*, August, 1890
 Anoplus plantaris, Næz.
 Elleschus bipunctatus, L. *Stratton Strawless*, *St. Faiths*
 Tychius quinquepunctatus, L. *South Creake* (Stephens)
 —venustus, F. *Norfolk* (Stephens)
 —meliloti, Steph. *Ditchingham* (Fowler)
 —tibialis, Boh. *Yarmouth*, June, 1883
 Miccotrogus picirostris, F.
 Miarus campanulæ, L. *Barton Bendish*, August, 1881
 —plantarum, Germ. *Bixley*, Sept., 1878
 Gymnetron villosulus, Gyll.
 —beccabungæ, L.
 —melanarius, Germ. *Asbwicken* (Fowler)
 —rostellum, Hbst. *Harford Bridges*, May, 1878
 —pascuorum, Gyll. *Postwick Grove*, June, 1875

CURCULIONINA (*continued*)

- Gymnetron labilis, Hbst. *Norfolk* (Fowler)
 —antirrhini, Payk.
 —linariæ, Panz. *Norfolk* (Stephens)
 Mecinus pyrastrer, Hbst.
 Anthonomus ulmi, De G.
 —rosinæ, Des Gozis
 —pedicularius, L.
 —pomorum, L.
 —rubi, Hbst.
 Nanophyes lythri, F.
 Cionus scrophulariæ, L.
 —thapsus, F. *Framingham Pigot*, June, 1878
 —hortulanus, Marsh. *Eaton, Earlbam*; *Fornett* (Brown)
 —blattariæ, F.
 —pulchellus, Hbst.
 Orobitis cyaneus, L. *Foxley Wood*; *Waxham* (Champion); *Yarmouth, Yelverton* (Brown)
 Cryptorrhynchus lapathi, L. *Heigham Osier Carr, Eaton Common*; *East Raynham* (Wood)
 Acalles ptinoides, Marsh. *Mousehold Heath*
 —turbatus, Boh. *Ringland*; *Bircham Newton* (Fowler)
 Coeliodes quercus, F.
 —ruber, Marsh. *Dunston Common, Thetford*; *Asbwicken* (Fowler)
 —cardui, Hbst.
 —quadrimaculatus, L.
 —geranii, Payk. *Norfolk* (Stephens)
 Poophagus sisymbrii, F.
 —nasturtii, Germ. *East Rudham* (Wood); *Heacham* (Fowler)
 Centorrhynchus assimilis, Payk.
 —setosus, Boh. *Ringland*, June, 1877; *St. Faiths* (Fowler)
 —strictus, Marsh.
 —cochleariæ, Gyll.
 —ericæ, Gyll. *Mousehold Heath*, etc.
 —erysimi, F.
 —contractus, Marsh.
 —cyanipennis, Germ.
 —chalybæus, Germ.
 —quadridens, Panz.
 —geographicus, Goeze. *Thetford*
 —pollinarius, Forst.
 —viduatus, Gyll. *Horning* (Elliman)
 —querceti, Gyll. *Horning*. All the recorded British examples of this species come from this locality
 —pleurostigma, Marsh.
 —alliaræ, Bris. *East Carlton*, June, 1879; *Brandon*, May, 1888
 —resedæ, Marsh. *Horning*; *Waxham* (Champion); *Cromer* (Walker)
 —rugulosus, Hbst. *Morston*, May, 1888; *Waxham* (Champion)

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CURCULIONINA (*continued*)

- Centorrhynchus melanostictus*, Marsh.
 — *asperifoliarum*, Gyll.
 — *chrysanthemi*, Germ. Near *Norwich* (Sparshall *vide* Stephens)
 — *triangulum*, Boh. *Mousehold Heath*, July, 1886; *Brandon* (Walker)
 — *trimaculatus*, F.
Centorrhynchidius floralis, Payk.
 — *hepaticus*, Gyll. *Ditchingham* (Fowler)
 — *pyrrhorhynchus*, Marsh.
 — *pulvinatus*, Gyll. *Hunstanton* (Blatch)
 — *melanarius*, Steph.
 — *terminatus*, Hbst. *Gimingham* (Butler)
 — *horridus* F.
 — *trogodytes*, F.
Tapinotus sellatus, F. *Horning*, 1838 (Brown); one specimen which remains unique as British
Amalus hæmorrhous, Hbst. *Ringland*, May, 1878; *Bowthorpe*, June, 1879; *Ashwick* (Fowler)
Rhinoncus pericarpus, L.
 — *gramineus*, Hbst. *Hickling*, June, 1888; *Brandon*, May, 1889
 — *perpendicularis*, Reich.
 — *castor*, F. *Mousehold Heath*; *Waxham* (Champion)
 — *bruchoides*, Hbst. *Mousehold Heath*, June, 1883; *Ashwick* (Power)
Eubrychius velatus, Beck. *Eaton Common*; *Aylsham* (Wood); *Waxham* (Champion)
Litodactylus leucogaster, Marsh.
Phytobius comari, Hbst. *Heigham*, *Brumstead Common*
 — *waltoni*, Boh. *Woodbastwick*, *Horning* (Fowler)
 — *quadrituberculatus*, F. *Norfolk* (Fowler)
 — *canaliculatus*, Fahr. *Poringland*, July, 1888; *Waxham* (Champion)
Limnobaris T-album, L.
Baris laticollis, Marsh. *Burrell's list*.
 — *picipornis*, Marsh. *Cromer*, *Sherringham*

CURCULIONINA (*continued*)

- Baris lepidii*, Germ. *Swanton Morley*, August, 1888
Balaninus venosus, Grav. *Ringland*, *Beeston Park*, *Foxley Wood*
 — *nucum*, L. *Foxley Wood*
 — *turbatus*, Gyll. *Dunston* (Thouless)
 — *betulæ*, Steph. *Eaton*, May, 1888
 — *rubidus*, Gyll. *Ringland*, September, 1875; *Ashwick* (Power)
 — *villosus*, F. *Brundall*, May, 1883
 — *salicivorus*, Payk.
 — *pyrrhoceras*, Marsh.
Magdalis armigera, Fourc.
 — *cerasi*, L.
 — *pruni*, L. *Aylsham* (Wood)

CALANDRINA

- Calandra granaria*, L. } *Norwich*
 — *oryzæ*, L. }

SCOLYTIDÆ

- Scolytus destructor*, Ol.
 — *multistriatus*, Marsh. *Eaton*, August, 1893 (Thouless)
Hylastes ater, Payk.
 — *opacus*, Er. *Ringland*, June, 1877
 — *palliatu*s, Gyll. *Stratten Strawless*, etc.
Hylesinus crenatus, F. *Cromer*, etc. (Fowler); *Aylsham* (Wood)
 — *oleiperda*, F. *Bowthorpe*, June, 1879; *Cromer* (Fowler); *Aylsham* (Wood)
 — *fraxini*, Panz.
Phlæophthorus rhododactylus, Marsh. *Weeting*, May, 1888
Cryphalus abietis, Ratz. *East Carlton*, May, 1877
Pityophthorus pubescens, Marsh. } *Cromer*
Dryocætes coryli, Perris. } (Elliman)

STYLOPIDÆ

- Stylops melittæ*, Kirby. Several times bred from *Andrena* by Bridgman

LEPIDOPTERA

The county of Norfolk, from its somewhat peculiar geological formations, its extensive coastline, and its very considerable area of fens and marshes, possesses a more than usually extensive, rich and varied entomological fauna. The total number of species of Lepidoptera is at least 1,460, and so large a proportion of these are of interest from their local distribution or actual rarity, that a local list, to be of value, must be of exceptional length.

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A slight preliminary sketch of its more important features may be useful. By great good fortune, records are preserved of some of the more interesting species in this county from a much earlier date than in most others. Thus with regard to that extraordinary species, *Hypogymna dispar*, of which the sexes are totally unlike each other; which has so mysteriously disappeared altogether from this country, and yet by accidental introduction to the United States of America has so devastated vast tracts of woodlands that it has cost and is now costing the government of that country hundreds of thousands of dollars in the struggle for its extermination; we are supplied with indubitable evidence of its former abundance with us. Mr. John Curtis writes thus (*British Entomology*, 1825-40): 'It is not easy to conceive the delight I experienced when a boy on finding the locality for the "Gypsy moth." After a long walk I arrived at the extensive marshes of Horning in Norfolk, having no other guide to the spot than the *Myrica gale*, and on finding the beds of that shrub, which grows freely there, the gaily-coloured caterpillars first caught my sight. They were in every stage of growth, some being as thick as swan's quills. I also soon discovered the moths, which are so different in colour as to make a tyro doubt their being partners. The large loose cocoons were also very visible, and on a diligent search I found bundles of eggs covered with the fine down from the abdomen of the female. With eggs, caterpillars, chrysalides and moths I speedily returned, enjoying unmixed delight in my newly-gained acquisitions.' Now, although *Myrica gale* still flourishes in abundance at Horning there is no trace of the moth, and no evidence exists as to the date or means of its extinction. The Rev. T. H. Marsh however records its existence further west, at Cawston, not uncommonly, till 1861. Since that date it has apparently never been seen in Norfolk; and except in most rare and casual instances, not within the British Isles.

The fens of Norfolk extending for many miles along the banks of the Yare, the Bure, the Thurn and the Ant form still, with those of Cambridgeshire, the sole haunts in these islands of that handsome and striking butterfly the swallow-tail (*Papilio machaon*), a species which abroad is by no means confined to fens, but flies at large in most parts of Europe, even ranging over mountain districts, and in hotter regions, as in Asia, especially affecting such situations. Why it should with us so scrupulously attach itself to fens, hardly ever flying a mile away from them, is probably an insoluble mystery. Happily the fens themselves are so situated, and so extensive, that there is little risk of its extermination. This advantage it shares with species of similar proclivities, such as *Spilosoma urticae*, *Arsilonche venosa*, *Nonagria neurica*, *Meliana flammea*, *Herminia cribralis*, *Schœnobius mucronellus*, *S. gigantellus*, *Peronea shepherdana*, *P. lorquiniana*, *Phoxopteryx paludana*, *Ergatis subdecurtella*, *Xystophora palustrella*, *Laverna phragmitella*, *Cosmopteryx lienigiella* and *C. orichalcea*, all of which are common to the Cambridgeshire fens as well as these. This protection is perhaps even more important in the cases of *Lithosia muscerda*, *Calamia brevilinea*, *Chilo paludellus* and *Sericoris doubledayana*, which seem

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not to be found in Cambridgeshire, and except perhaps in the case of *L. muscerda*, nowhere else in the United Kingdom. *Calamia brevilinea* has a wonderful, and even a rather complete history, so far as the history of any species can be completely worked out. It appears certain that it had no existence in Ranworth Fen at the time, forty years ago, when W. Winter collected for two or three years largely there, sending his captures to purchasers everywhere, and showing himself to be a very skilful and accurate collector. In 1864 the first specimen was captured in the same fen, and after much hesitation and enquiry was described and published as a new British species. Several years elapsed, and then another was taken, and immediately afterwards a few more ; after this it steadily increased in numbers, until it is now in some seasons almost the most frequent noctua to be seen in an August night, at 'light,' in the fen. Moreover it has now spread to other fens at least ten miles away. Yet no record exists of its occurrence, except as a single example in Belgium, in any other part of the world ! Much the same may be said of the pretty little *Sericoris doubledayana*, which I had myself the pleasure of discovering in the same fen in plenty in 1872, which continues commonly there, but of which I have no certain knowledge anywhere else.

Another species of interest is *Macrogaster arundinis*, which, conversely, used to be found only in the Cambridge fens, and which I tried to introduce, in the egg, into Norfolk about the year 1868. The capture of two males in the same spot ten years later seemed to indicate success, but no more have been found there ; yet within the last ten years specimens have been secured in other fens at more than ten miles distance, giving colour to the belief that it may after all be one of the ancient inhabitants of the county, hitherto overlooked.

Leaving the interesting subject of the fens there is another tract of country to which especial attention must be drawn, that lying around Brandon, Thetford, Watton, Merton, and extending into the west of Suffolk and the east of Cambridgeshire. It is known as the 'Breck-sand,' the soil consisting of sand so loose that a field, if ploughed up in the daytime, may not unfrequently be blown level again by a strong wind in the night. It is understood to be the ancient sandy coast of the sea of the later Post-Glacial period, but now has lost the peculiar botanical features of the sea-coast, except in the existence still in plenty of two species of sea-side plants—a grass and a sedge—yet to all appearance its insect fauna remains unchanged, such sea-side species as *Agrotis vallisera*, *Mamestra albicollis*, *Anerastia lotella*, *Bryotropha desertella*, *Lita marmorea* and *Argyritis pictella* being still to be found, often in abundance ; and more rarely *Agrotis præcox* and *Mesotype lineolata*. All these as is well known are otherwise distinctively the ordinary inhabitants, almost exclusively, of coast sandhills, and most of them are to be found on the present coast of Norfolk, distant twenty or thirty miles. But this 'Breck-sand' also furnishes a home to another series of species of even greater attractions, since though well known on the continent of Europe, they are for some reason of too delicate organization to exist at all, or only very rarely, on any

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other soil in these islands, yet in the district now under notice are often abundant. Such are *Agrophila sulphuralis*, *Acidalia rubricata*, *Lithostegia nivearia*, *Oxyptilus distans*, *Tinea imella*, and more rarely *Dianthecia irregularis*.

A circumstance which must not be overlooked is the geographical position of the county, and the great probability of its serving as a refuge for insects driven by the occasional migratory impulse from the opposite shores of the Netherlands, Denmark, the Baltic coast, or Scandinavia. To such an impulse in themselves or in their progenitors may possibly be ascribed the occurrence of such exceedingly rare species as *Syrichthus alveus*, *Notodonta torva*, *Noctua flammata*, *Gloantha perspicillaris*, *Heliothis scutosa* and *Ophiodes lunaris*; while to more successful immigrations may be due the presence as residents of such species as *Eupithecia extensaria*, *Cateremna terebrella*, *Tortrix decretana*, *T. lafauryana*, *Coccyx ochenheimeriana* and *Bryotropha tetragonella*; possibly also some which we have been accustomed to look upon as restricted to northern mountain districts—*Mixodia palustrana*, *M. rubiginosana* and *Cedestis gysselinella*.

There is work of abundant interest to be found also in the extensive tracts of heath land, interspersed with bog and marsh, lying between Sandringham and King's Lynn, with their apparently inexhaustible riches in Micro-Lepidoptera; also in the chalk districts around Swaffham and elsewhere, or at Ringstead near Hunstanton, with their casual or frequent production of the insects of the South Downs. In the following list universally common species have not been enumerated:—

RHOPALOCERA

Papilio machaon, Linn. In the fens of the *Bure*, *Yare* and other rivers. This fine species, which is very extensively distributed over the globe, is in this country usually confined to two counties, of which Norfolk is one. Here, flying swiftly along the fen drains, and the banks of the slower rivers, or haunting the beds of wild flowers in swampy spots, it is by no means uncommon, and its larva may often be found feeding upon the leaves of the milk parsley (*Peucedanum palustre*). From the difficult or almost inaccessible nature of much of this ground there is good cause for hope that it will not readily be exterminated in this county.

Pieris cratægi, Linn. Formerly taken in the county; but, as in most other parts of England, now extinct.

Colias edusa, Linn. Extremely irregular and uncertain in its appearances, but at intervals widely spread in the county.

— *hyale*, Linn. *Norwich*, *Lynn*, *Hal-*

vergate, *Potter Heigham*, *Merton*, *Thetford*, *Aldeby*; very uncertain; common in the years 1868 and 1900.

Thecla betulæ, Linn. Found at *Sall* by the Rev. T. H. Marsh, and also recorded by Curtis (*British Entomology*, p. 264) as found in Norfolk.

— *w.-album*, Ill. Very local; *Newton St. Faiths*, *Lynn*, *Denton*, *Stoke Holycross*.

— *quercus*, Linn. Local, upon the outskirts of woods and occasionally in the fens.

— *rubi*, Linn. *Norwich*, *St. Faiths Heaths*, *Swannington*, *Stody*, *Merton*, *Thetford*, *Broome Heath*, and commonly at *Cawston*.

Chrysophanus phlæas, Linn. Common. Varieties with pale clouding on the fore wings are not unfrequent on boggy heaths, and a form having the hind wings wholly black, and the fore wings broadly bordered with the same colour, while the usual spots are nearly obliterated, has been taken near *Lynn*.

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- Polyommatus ægon*, Bork. Locally common on boggy heaths
- *agestis*, Schiff. (medon, Esp. ; *astrarche*, Bgs.). *Norwich*, *Hunstanton*, *Lynn*, *Merton*, *Thetford*, *Broom Heath*
- *corydon*, Fab. Abundant at Ringstead Downs ; found casually at *Hunstanton*, *Lynn* and *Snettisham*
- *argiolus*, Linn. *Cawston*, *Boaton*, *Thetford*, *Broome* and *Gillingham* ; but not common
- *alsus*, Fab. (*minima*, St. C.). *Cromer* and *South Creak*, scarce ; but found plentifully near *Swaffham* by Mr. Atmore in 1898
- *acis*, Sch. (*semiargus*, St. C.). Recorded in this county by Haworth and Stephens in the early parts of the century, but, as in other parts of England, long since extinct
- Apatura iris*, Linn. *Foulsham*, *Dersingham*, but rare ; formerly at *Whitlingham* ; not scarce in *Foxley Wood*
- Vanessa c.-album*, Linn. Very rare in the county. The Rev. W. F. Welch informed Lord Walsingham that he saw a specimen in his garden at *Steadsett* in October, 1858, and took one in the same place in September, 1861 ; the Rev. J. W. Colvin took one in the Rectory garden at *Yarmouth* ; and Mr. E. A. Atmore reports a specimen at *Walpole*
- *polychloros*, Linn. Widely distributed and formerly common ; now very uncertain in appearance
- *antiopa*, Linn. An occasional migrant. In 1872 it was suddenly observed quite commonly in the county, especially at its north-east corner, and a considerable number were taken. Within a few days the course of the migrating flock was traced in some degree across the county and onward until specimens reached scattered localities in the West of England. It has been recorded casually in the county so early as 1834, and in various other years to 1891
- Argynnis paphia*, Linn. Generally uncommon ; much more plentiful in *Foxley Wood*
- *iaglaia*, Linn. Almost confined to the east coast, but once found commonly at *Whitesley*
- *adippe*, Linn. Local in the woods of the north and west of the county
- *lathonia*, Linn. Excessively rare. I have seen a specimen which was taken at *Plumstead*, near *Norwich* ; others are recorded at *Beechamwell*, *Hakvergate*, *Caistor* and *Boaton*
- Argynnis euphrosyne*, Linn. Local in this county. *Stratton Strawless*, *Horsford*, *Tindall Wood*, *Cawston*, *Runcton*, *Mid-dleton* ; in woods
- *selene*, Fab. Local in most of the same woods ; also at *Hoveton St. John*, *Hethel* and *Wootton*
- Melitæa artemis*, Fab. (*aurinia*, St. C.). In marshy meadows ; very local. *Norwich*, *St. Faiths*, *Horning*, *Cawston*, *Aldeby* and *Beachamwell*
- Melanargia galathea*, Linn. Found locally at *Kirby Cane* by Dr. W. M. Crowfoot, who also noticed that it moved from one spot to another almost every season. Recorded in *Norfolk* by Curtis
- Satyrus semele*, Linn. Common on coast sandhills and inland heaths
- Pararge ægeria*, Linn. *Norwich*, *Merton*, *Thetford*, *Ditchingham*, *Sparham* ; uncommon in the county
- Epinephile tithonus*, Linn. Abundant
- *hyperanthus*, Linn. Plentiful in damp woods
- Syrichthus alveus*, Hüb. Several specimens were captured about twenty-five years ago in a damp hollow at the edge of a wood at *Cawston*, by the Rev. T. H. Marsh. These I found in his collection under the name of the next species, to which he had referred them—the latter being apparently absent from that district. The locality has been carefully searched in many subsequent years, but no more specimens have been found. This species is scarcely known otherwise as British, and it is supposed that a small migration from the other side of the North Sea may have taken place, but without causing a permanent settlement
- *alveolus*, Hb. *Woodton*, *Tyndall Wood*, *Ditchingham*, *Ketteringham*, *Horning* ; scarce and very local in the county
- Hesperia comma*, Linn. Taken by Mr. Atmore, near *Swaffham*
- Cyclopides paniscus*, Fab. A single specimen was taken near *Thetford*, in the presence of the Rev. H. Williams
- Nisoniades tages*, Linn. *Ditchingham*, *Ketteringham*, *Cawston* ; very local, yet recorded in the county by Haworth and Stephens

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HETEROCERA

- Smerinthus ocellatus*, Linn. Widely distributed, and rather common in the fens, feeding quite as frequently upon *Salix capræa* as upon the narrow-leaved willows
- *populi*, Linn. Common, and not confined to poplar, but feeding also upon broad-leaved willows
- *tiliæ*, Linn. Scarce, but found on lime near *Norwich*, *Merton*, *Thetford*, *Lynn*, *Raveningham*, *Sparham*, *Cawston* and *Horning*
- Acherontia atropos*, Linn. Found occasionally in all parts of the county, but usually in the larva state
- Sphinx convolvuli*, Linn. Also found occasionally in various parts of the county; in the year 1887 it suddenly appeared in considerable numbers, and many were taken—nearly thirty in my own garden at *King's Lynn*
- *ligustri*, Linn. Generally common; its magnificent green larva, with lilac and white oblique side-stripes, and a caudal horn, may be found on privet bushes in the gardens, and at the road-sides
- Deilephila galii*, Sch. Very rare, but taken at *Denton* in 1888 by the Rev. C. T. Cruttwell; also at *Gillingham* near *Beccles* by Dr. Crowfoot; and at *Yarmouth*
- *euphorbiæ*, Linn. I had the singularly good fortune to capture a male specimen, hovering at flowers of *verbena*, in my garden at *King's Lynn*, on September 7th, 1887. This I believe to be the only example ever taken in the county
- *livornica*, Esp. There is a reliable record of the capture of a single specimen at *Thetford* in 1857; and another of the occurrence of an example at the electric light at *Carrow* near *Norwich* in 1891. Stephens gave this rare species as an inhabitant of the county (*Illustrations*, vol. i. p. 127), but without locality
- Chærocampa celerio*, Linn. Also recorded by Stephens, but without definite locality
- *porcellus*, Linn. *Norwich*, *Yarmouth*, *Ketteringham*, *Horning*, *Lynn*, *Hunstanton*, *Cawston*, *Merton*, *Thetford*, *Broome*; not very common
- *elpenor*, Linn. Generally distributed, especially frequenting marshy spots
- Macroglossa stellatarum*, Linn. Widely distributed; rather common on the coast; most attractive from its habit of poisoning itself at flowers like a humming-bird
- Macroglossa fuciformis*, Linn. *Merton*, *Heydon*, *Cawston*, *Horsford*, *Briston*, *Drayton* and around *King's Lynn*; not common
- *bombylifomis*, Esp. *Woodbastwick*, *Cawston*, *Horsford*; scarce
- Sesia spheciformis*, Sch. Taken by the Rev. T. H. Marsh at *Horsford* near *Norwich*; possibly wherever alder is abundant
- *tipuliformis*, Linn. *Norwich*, *Yarmouth*, *Lynn*; in gardens
- *myopiformis*, Bkh. *Norwich*; in gardens, among old apple trees
- *culiciformis*, Linn. *Norwich* and *Dilham*; rare
- *formiciformis*, Esp. *Norwich*, *Brundall* and *Kings Lynn*; among osier
- *ichneumoniformis*, Sch. Recorded by old authors as having been taken at *South Creak* in 1823. It does not seem to have been noticed in the county since that date
- Sphæcia apiformis*, Linn. Common around *Norwich*; also found at *Costessey*, *Mort-ham*, *Cawston* and elsewhere, on poplars; more frequent in the eastern counties than elsewhere in the United Kingdom
- *bembeciformis*, Hb. *Foxley*, *Hockering*, *Sparham*, *Hindolveston*, *Kerdiston*, and *Neatishead*; among willow
- Procris statice*, Linn. *Brandon*; recorded by Paget long ago at *Caistor*; found recently in plenty by Mr. Atmore near *Lynn*; and singly at *Hemsby* by Mr. Knights
- Zygæna trifolii*, Esp. Near *Norwich* and *Lynn*, also at *Cawston*, *Ranworth*, *Horning* and *Neatishead*; in damp meadows and fens
- *loniceræ*, Esp. *Foxley Wood* and *Aldeby*; local
- *filipendulæ*, Linn. *Thetford*, *Aldeby*, *Cawston* and near *Lynn*; but uncommon and very local in this county; abundant in many parts of England
- Macrogaster arundinis*, Hb. Two specimens were taken at *Ranworth Fen* in June, 1878, by Mr. W. H. B. Fletcher; three near *Horsey* in August, 1898, by Mr. Percy C. Reid, and one this year near *Hickling*, by Dr. F. D. Wheeler
- Zeuzera æsculi*, Linn. *Norwich*, *Lynn*, *Yarmouth*, *Thetford*, *Merton*, *Denton*, *Geldeston*, *Whitwell*; scarce. Dr. Plow-

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- right discovered, at *Lynn*, that the greater spotted woodpecker extracts the larvæ of this species from their burrows in the twigs of trees, and thereby doubtless prevents its becoming common
- Cossus ligniperda*, Fab. Generally distributed, and very destructive to willow, poplar, ash, and oak trees, its larva burrowing under the bark and through the solid wood, and causing decay
- Hepialus sylvinus*, Linn. Locally common on heaths
- *hectus*, Linn. Local, but common in woods
- Limacodes testudo*, Sch. *Cawston*, *Drayton*, *Felthorpe*, *Horsford*; scarce
- Hylophila prasinana*, Linn. In woods generally; not scarce
- *quercana*, Sch. *Merton*, *Foxley Wood*, *Horsford*; rather common at *Croxton* and *Lynn*
- Earias chlorana*, Linn. *Norwich*, *Barton Turf*, *Horning*, *Ranworth* and other fens; not scarce at *Lynn*
- Nola cucullatella*, Linn. Generally distributed among hawthorn and blackthorn, and in gardens about fruit trees
- *strigula*, Sch. Recorded by Paget at *Yarmouth*
- *confusalis*, Hb. Not scarce around *Norwich* and at *Foxley*, *Cawston*, *Sparham* and *Hockering*; also found at *Lynn* and *Denton*
- Nudaria senex*, Hb. Very common in the fens, and to be found more sparingly in marshy spots generally
- *mundana*, Linn. *Merton*, *Aldeby*, *Yarmouth*, *Cawston* and *Horning*; not common
- Calligenia miniata*, Forst. Widely distributed in woods and on wooded heaths
- Setina irrorella*, Linn. Mr. F. Norgate reports the capture of this local species in *Foxley Wood*
- *mesomella*, Linn. Widely distributed on boggy heaths, and in woods and even fens
- Lithosia muscerda*, Hb. Common at *Ranworth*, *Horning*, *Irstead*, *Dilham*, *Brundall* and elsewhere in the fens. Plentiful in some seasons; but almost confined to the fens of *Norfolk*, so far as the British Isles are concerned
- *aureola*, Hb. *Norwich*, *Merton*, *Denton*, *Sparham* and *Lynn*, occasionally; much more frequent in *Hockering* and *Foxley Woods*
- *helveola*, Ochs. *Cawston*, *Cromer*, *Stratton Strawless*; scarce
- Lithosia complana*, Bdv. *Merton*, *Thetford*, *Yarmouth*, *Cawston*, *Lynn*, *Horning*, *St. Faiths* near *Norwich*. A variety tending towards that known as *L. molybdeola*, Gn., is found on heaths near *Brandon* and *Merton*
- *griseola*, Hb. Generally common, and abundant in the fens, where also its beautiful ochreous variety, *L. stramineola*, is not scarce
- *rubricollis*, Linn. Generally distributed in woods, but not common
- Ctenistis quadra*, Linn. *Norwich*, *Horsford*, *Merton*, *Barton*, *Bendish*, *Drayton*, *Horning*; very uncommon
- Euchelia jacobææ*, Linn. Generally distributed; often abundant
- Callimorpha dominula*, Linn. Two specimens have been taken at *Burgh* near *Aylsham*, by Mr. Godfrey Burr
- Euthemonia russula*, Linn. Of general distribution on heaths
- Nemeophila plantaginis*, Linn. *Ketteringham*; very local
- Arctia villica*, Linn. *Norwich*, *Thetford*, *Merton*, *Brandon* and *Broome*
- Phragmatobia fuliginosa*, Linn. *Norwich*, *Merton*, *Brandon*, *Billingford*, *Sparham*, *Cawston*, *Horning*; scarce
- Spilosoma mendica*, Linn. *Norwich*, *Lynn*, *Cawston*, *Sparham*, *Merton*, *Horstead*; not common
- *urticæ*, Esp. *Norwich*, *Surlingham*, *Horning*, *Lynn*, *Barton Turf*, *Gillingham*, *Thetford*; mainly confined to fens
- Porthesia chrysorrhœa*, Linn. This species has been found at *Norwich*, *Yarmouth*, *Aldeby* and *Sparham*; but I know of no recent captures
- *auriflua*, Fab. Everywhere abundant about hedges
- Liparis salicis*, Linn. *Norwich*, *Yarmouth*, *Thetford*, *Gillingham*, *Horning*, *Hickling*, *Glenchwarton*, *Lyng*, *Barton*; formerly plentiful, but now apparently extinct in some of these localities, and generally greatly reduced in numbers
- Hypogymna dispar*, Linn. At the beginning of the present century, or the end of the last, very plentiful at *Horning*, where Curtis found it flourishing in such abundance that 'eggs, caterpillars, chrysalides and moths' could all be collected by him upon the same day. It was also found at *Cawston*, and there continued until the year 1861, since which period it has not, I think, been observed at large in the county, and scarcely in any other part of the British Isles
- Psilura monacha*, Linn. Near *Norwich*, also

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- at *Merton, Denton, Cawston, Foulsham* and *Foxley Wood*; usually confined to large woods
- Dasychira pudibunda*, Linn. Generally distributed, sometimes common
- *fascelina*, Linn. *Norwich, Yarmouth*; found occasionally, in the larva state only, and generally on hedge-banks
- Demas coryli*, Linn. *Thetford, Foxley Wood*; local
- Orgyia gonostigma*, Linn. *Horning and Ranworth Fens*; scarce
- Fumea roboricolella*, Br. *Merton, Cawston, Foxley Wood*; probably widely distributed
- *betulina*, Z. *Ranworth and Horning*; scarce
- Pœcilocampa populi*, Linn. Generally distributed, but not very common
- Trichiura cratægi*, Linn. *Norwich, Lynn, Sparham, Cawston, Hockering, Foxley Wood*; scarce
- Eriogaster lanestris*, Linn. Plentiful in some seasons, its larvæ forming large silken nests on the hawthorn hedges
- Clisiocampa neustria*, Linn. Generally distributed
- Lasiocampa rubi*, Linn. Widely distributed on heaths
- *quercus*, Linn. In all wooded districts
- Odonestis potatoria*, Linn. Common; more especially so in the fens
- Gastropacha quercifolia*, Linn. Widely distributed, but not very common
- Saturnia carпинi*, Bkh. This usually heath-frequenting species, is *here* far more frequent in the fens, and seems to feed most freely upon *Spiræa ulmaria*
- Drepana falcatoria*, Linn. Generally distributed, and sometimes abundant among birch
- *hamula*, Sch. Oak woods in the *Norwich* district, *Merton, Thetford, Barton Bendish, Wormegay, Foxley, Drayton, Felthorpe and Alderford*
- *unguicula*, Hb. *Merton and Thetford*; among beech, but very local
- Platypteryx lacertinaria*, Linn. *Merton, Northwold*, scarce
- Cilix spinula*, Sch. Generally common
- Cerura bicuspis*, Bkh. Two larvæ of this very rare species were found upon alder at *Aylsham* in 1881 by Mr. F. Norgate. The cocoons (empty) have been observed at *Merton and Sparham*
- *furcula*, Linn. *Yarmouth, Thetford, Merton, Stratton Strawless, Hoveton, Irstead, Barton Turf*; most frequent in fens, and usually captured on sallow in the larva state
- Cerura bifida*, Hb. *Norwich, Thetford, Aldeby, Cawston and Drayton*; among poplar and aspen
- *vinula*, Linn. Generally distributed; quite common as a larva upon Canadian poplar in gardens in the suburbs of *Norwich*
- Stauropus fagi*, Linn. *Norwich, Horsford, Stratton Strawless, Thetford, Drayton, Cawston, Foulsham, Hockering Wood, Cromer*; always about woods or wooded heaths. A black variety was captured by Mr. Thouless at the *Carrow* electric lights. John Curtis is said to have found it in the beginning of the century in the Cathedral Close at *Norwich*; and more than two centuries ago it was said by Mouffet to be common in *Norfolk*
- Notodonta dictæa*, Linn. *Norwich, Cromer, Thetford, Merton, Gillingham, Foulsham*; not common
- *dictæoides*, Esp. *Norwich, Cromer, Thetford, Merton, Foulsham*; and Mr. Atmore reports that it has recently become of frequent occurrence near *Kings Lynn*
- *ziczac*, Linn. Apparently in all the fens and wet woods; usually found in the larva state on sallow
- *trepida*, Fab. *Norwich, St. Faiths, Stratton Strawless, Merton, Croxton, Drayton, Kings Lynn*; scarce
- *torva*, Linn. The only satisfactorily known British specimen was reared by Mr. F. Norgate from one of a batch of larvæ found by him upon white poplar in the north-west of *Norfolk*. The remaining larvæ unfortunately died
- *dromedarius*, Linn. *Norwich, Aylsham, Cawston, Runham, Lynn, Foxley, Drayton, Whitwell, Merton*; not common
- Drymonia chaonia*, Sch. *Norwich, Stratton Strawless, Howe, Drayton, Cromer, Cawston, Denton*; rare
- *dodonæa*, Sch. *Norwich, Rackheath, Stratton Strawless, Cromer, Cawston, Merton, Thetford, Denton, Gillingham*; scarce
- Lophopteryx camelina*, Linn. *Norwich, Lynn, Cawston, Thetford, Gillingham*; common in *Foxley Wood*
- *cucullina*, Sch. Very rare; once taken at *Norwich* by Dr. F. D. Wheeler; larvæ found at *Runton, Arminghall, Sherringham, Horning, Morton and Sparham*
- Philodontis palpina*, Linn. Widely distributed among poplar; sometimes rather common in marshes

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- Petasia cassinea*, Fab. *Norwich, Merton, Thetford, Cawston, Sparham, Hockering, Lynn and Foxley Wood*
- Clostera curtula*, Linn. *Merton, Thetford, Hingham*; rare
- *anachoreta*, Fab. *Barton*. A colony introduced here from the south coast, is said to be thriving
- *reclusa*, Sch. Apparently generally distributed on boggy heaths and in fens among the dwarf willows
- Diloba cæruleocephala*, Linn. Generally distributed, and in some seasons plentiful. At *Denton Rectory* I saw larvæ feeding freely upon *Pyrus japonica*, its ordinary food being hawthorn or blackthorn
- Gonophora derasa*, Linn. Widely distributed in woods, but not common
- Thyatira batis*, Linn. Also rather uncommonly in similar situations
- Cymatophora duplaris*, Linn. *Norwich, St. Faiths, Merton, Aldeby, Foxley, Foulsham, Neatishead, Horning, Lynn*; not plentiful
- *or*, Sch. *Foxley, Foulsham, Denton, Neatishead*
- *ocularis*, Linn. *Norwich, Lynn, Cawston, Foulsham, Yarmouth, Denton, Gillingham, Thetford*; not rare among poplar
- Asphalia diluta*, Sch. *Merton, Neatishead, Foulsham*; not generally common in the county, but plentiful in *Foxley Wood*
- *flavicornis*, Linn. *Merton, Drayton, Stratton Strawless*; common near *Lynn* and at *Wootton*
- *ridens*, Fab. *Norwich, Stratton Strawless, Felthorpe, Cawston, Drayton, Denton*; not very common
- Diphthera orion*, Esp. Taken near *Aldeby* by Dr. Crowfoot; not observed elsewhere in the county
- Acronycta leporina*, Linn. *Norwich, Stratton Strawless, Lynn, Runham, Horning, Foulsham, Cawston, Foxley, Merton, Thetford*; not very common
- *aceris*, Linn. Generally distributed
- *megacephala*, Sch. *Norwich, Yarmouth, Thetford, Merton, Aldeby, Foxley, Cawston, Horning*; sometimes common
- *alni*, Linn. *Merton, Foxley, Cawston, Foulsham, Sall, Aylsham, Stratton Strawless*; always rare, but recorded in the county by Haworth and Stephens
- *strigosa*, Fab. Recorded at *Foulsham* by the Rev. T. H. Marsh. Stephens writes: 'Mr. Haworth possesses a single specimen of this insect, which I believe was taken in *Norfolk*.' The headquarters of the species are in *Cambridgeshire*
- Acronycta tridens*, Sch. *Norwich, Dunston, Thetford, Merton, Aldeby, Lynn, Cawston, Horning, Barton Turf*; not very rare
- *menyanthes*, Esp. Two larvæ were found by Dr. F. D. Wheeler in fens, one at *Hickling Broad*, the other at *Barton Turf*; of these one was reared, and is unquestionably the present species. Usually quite a northern insect
- *rumicis*, Linn. *Merton, Thetford, Aldeby, Cawston, Horning*; not common in this county
- *ligustri*, Sch. *Merton, Thetford, Aldeby, Foxley, Cawston, Foulsham, Lynn*; not common
- Arsilonche venosa*, Bkh. (*albovenosa*, St. C.). *Ranworth, Horning, Reedham*; found only in the fens
- Agrotis valligera*, Sch. (*vestigialis*, St. C.). Common on all the sandhills of the coast, and also on the loose sands of the ancient coast known as the 'Breck-sand,' near *Thetford, Brandon* and *Merton*
- *suffusa*, Sch. Generally distributed
- *corticea*, Sch. *Norwich, Merton, Thetford, Cawston, Lynn, Hingham, Horning*; not scarce; sometimes in very black forms on the coast
- *puta*, Hb. *Norwich, Aldeby, Thetford, Lynn, Cawston, Hunstanton*; not very common
- *ripæ*, Hb. *Caistor, near Yarmouth, Hunstanton, Heacham*; probably wherever *Salsola kali* grows on the sea-sands
- *cursoria*, Bkh. Abundant on the sandhills of the coast, at *Yarmouth, Caistor, and Hunstanton*. Not found inland
- *nigricans*, Linn. Generally distributed, and in great variety
- *tritici*, Linn. Very abundant upon coast sandhills, and richly and variably coloured; also, in similar rich forms, in plenty throughout the 'Breck-sand' district; and in more dull and ordinary forms to be found occasionally on all heaths
- *aquilina*, Sch. *Norwich, Brandon, Thetford, Horning, Cawston, St. Faiths*; sometimes common
- *agathina*, Dup. *Lynn*; on heaths, but rare
- *porphyrea*, Sch. Common on heaths
- *præcox*, Linn. *Yarmouth, Caistor, Hunstanton*; on the coast sandhills; also rarely near *Thetford* on the 'Breck-sand'
- *saucia*, Hb. *Norwich, Yarmouth, Lynn, Cawston, Dilham, Sparham, Thetford, Aldeby*; uncertain, usually scarce

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- Agrotis pyrophila*, Sch. Reported to have been once taken at *Yarmouth*; but very doubtful
- *ravida*, Sch. *Lynn, Hunstanton, Thetford*; scarce. Recorded as a Norfolk species by Haworth and Stephens
- Axylia putris*, Linn. Widely distributed
- Triphæna fimbria*, Linn. Generally distributed in woods, and rather common at *Foxley*
- *janthina*, Sch. Widely distributed
- *interjecta*, Hb. Also generally distributed; to be seen flying along hedges in the afternoon sunshine
- *subsequa*, Sch. *Thetford, Croxton, Brandon*, occasionally; more rarely at *Yarmouth* and *Lynn*
- Noctua glareosa*, Esp. *Thetford, Aldeby, Croxton, Sparham, Cawston, Neatishead, Lynn, West Winch*; common
- *augur*, Fab. Widely distributed, especially in fens
- *triangulum*, Ochs. In most woods sparingly, but common at *Foxley*
- *flammatra*, Fab. A single example of this great rarity was obtained at 'light' at *Cromer* in 1875, by Mr. W. H. Thornthwaite. It is figured in the *Lepidoptera of the British Isles*. One or two other British specimens are known
- *ditrapezium*, Hb. *Foxley Wood*; rare
- *rhomboidea*, Tr. *Thetford, Merton, Aldeby, Hackford, Sparham*; not common
- *brunnea*, Sch. Widely distributed in woods, but not very common
- *dahlia*, Hb. *Aldeby, Denton, Wootton, Horning*; scarce
- *neglecta*, Hb. *Denton*; taken by the Rev. C. T. Cruttwell
- Eurois herbida*, Sch. Very local here; found at *Cawston, Foulsham, and Neatishead*, and in abundance at *Foxley Wood*
- *occulta*, Linn. Very scarce, but has been taken at *Yarmouth, Geldestone, Thetford, Foulsham*, and near *Lynn*
- *adusta*, Esp. *Aldeby, Horning*; scarce; more plentiful at *Foxley Wood*
- Charæas graminis*, Linn. Generally distributed, but not common
- Heliophobus popularis*, Fab. General on grass land
- *cespitis*, Sch. *Norwich, Merton*; scarce
- Neuria saponariæ*, Esp. Widely distributed, but not common
- Apecta advena*, Sch. *Aldeby, Thetford, Ketteringham, Hingham, Foxley, Cawston, Foulsham, Lynn*; rather local. Recorded in Norfolk by the older writers under the name of *nitens*
- *nebulosa*, Tr. *St. Faiths, Thetford, Hocker-*
ing, Foxley, Cawston, Foulsham, Horning,
and near *Lynn*; not common
- Hadena thalassina*, Sch. *Norwich, Thetford, Aldeby, Cawston, Lynn*; not common
- *suasa*, Sch. *Norwich, Yarmouth, Aldeby, Thetford, Cawston, Lynn, Ranworth, Horning*; scarce
- *pisi*, Linn. Generally distributed
- *genistæ*, Bkh. *Horsford, Thetford, Brandon*; scarce
- *chenopodii*, Sch. *Norwich, Lynn, Cawston, Thetford, Brandon*; common in the 'Breck-sand' districts and on some parts of the coast
- Mamestra albicolon*, Hb. *Yarmouth, Hunstanton* and elsewhere on sandy coasts, and also rather commonly near *Thetford* and *Brandon* on the 'Breck-sand'
- Hecatera dysodea*, Sch. *Norwich, Thetford, Aldeby, Cawston*; local
- *serena*, Sch. Generally distributed
- Dianthecia irregularis*, Hufn. This rare species has been taken by the Rev. H. Williams and others at *Croxton* and elsewhere around *Thetford*
- *carphaga*, Bkh. *Norwich, Merton, Thetford, Croxton, Foxley, Cawston, Cromer*; rather common in the 'Breck' district
- *cucubali*, Sch. Frequent in the fens and marshy places among *Lychnis flos-cuculi*
- *conspersa*, Sch. *Aldeby, Geldestone, Thetford, Ketteringham, Horning*; scarce
- Polia flavicincta*, Linn. *Norwich, Thetford, Kirby Cane, Yarmouth, Lynn, Horning*; often in gardens
- Dryobota protea*, Sch. *Norwich, Thetford, Aldeby, Cawston, Lynn*; very local, occasionally common
- Cleoceris viminalis*, Fab. *Aldeby, Merton, Cawston, Ranworth, Horning*, in marshy places, but not common, more plentiful in *Foxley Wood*
- Chariptera aprilina*, Linn. Widely distributed in oak woods
- Miselia oxyacanthæ*, Linn. Generally common
- Cerigo cytherea*, Fab. Generally distributed
- Hama abjecta*, Hb. *Yarmouth, Horning*; rare; more frequently on the coast near *Lynn*
- *anceps*, Hb. Generally distributed
- Xylophasia sublustris*, Esp. *Yarmouth, Aldeby, Foxley, Cawston*; not common
- *rurea*, Fab. *Norwich, Merton, Aldeby, Cawston, Hingham*; rather uncommon
- *hepatica*, Linn. *Norwich, Aldeby, Hingham, Hockering, Cawston*
- *scolopacina*, Esp. *Geldestone, Gillingham,*

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- Foxley, Wootton, Lynn, Cawston, Beeston St. Andrew*; scarce
- Apamea basilinea*, Sch. *Norwich, Kirby Cane, Thetford, Merton, Cawston*; not common
- *gemina*, Hb. *Norwich, Aldeby, Thetford, Cawston, Lynn*; not very common
- *unanimis*, Hb. *Norwich, Brundall, Merton, Thetford, Aldeby, Foxley, Cawston, Ranworth, Horsey, Lynn*; in the fens and marshy meadows
- *connexa*, Bkh. *Foxley, Foulsham, and Neatishead*; very local, and uncommon in the county
- *ophiogramma*, Esp. *Norwich, Aldeby, Horning*; in fens among *Phalaris arundinacea*
- Celæna Haworthi*, Curt. *Lynn, Merton, Horning, Ranworth*; scarce, and here confined to fens, but larger and more brightly coloured than in its more usual northern localities
- Miana literosa*, Haw. *Norwich, Yarmouth, Hunstanton, Thetford, Aldeby, Foxley, Cawston, Horning, Thurn*; most frequent on the coast
- *fasciuncula*, Haw. *Norwich, Brundell, Yarmouth, Aldeby, Thetford, Cawston, Rising, Horning*; abundant in the damp meadows which border the fens
- *furuncula*, Sch. *Norwich, Aldeby, Merton, Brandon, Thetford, Hunstanton, Wootton, Cawston, near Horning*; local, but abundant in rough fields on the coast, and in chalky fields inland
- Eremobia ochroleuca*, Sch. *Norwich, Aldeby, Thetford, Denton, Hackford, Hunstanton*; scarce
- Dipterygia pinastri*, Linn. Widely distributed in woods
- Cloantha perspicillaris*, Linn. The capture of a single specimen at *Yarmouth* was recorded in the *Entomologist*, 1st series, p. 128 (1841). After the lapse of half a century, a second was secured by Dr. E. W. Carlier at a gas lamp in the outskirts of *Norwich* in the year 1892. This is one of the rarest of British species
- Trachæa atriplicis*, Linn. *Thetford, Croxton, Middleton, and Bawsey near Lynn*; very scarce
- Helotropha fibrosa*, Hb. *Norwich, Surlingham, Aldeby, Cawston, Ranworth, Horning, Lynn*; common in the fens
- Hydræcia nictitans*, Linn. *Norwich, Merton, Hoveton, Horning, Hunstanton*
- *petasitis*, Dbl. I have seen a single specimen which was taken at *Costessey near Norwich*; probably it is in some degree overlooked
- Gortyna flavago*, Sch. *Norwich, Surlingham, Yarmouth, Merton, Thetford, Lynn, Cromer*; not very common
- Nonagria cannæ*, Och. Taken at *Barton Broad* by Dr. F. D. Wheeler, and also near *Stalham*. Strictly confined to the fens, and in them very local
- *typhæ*, Esp. *Norwich, West Caistor, Aldeby, Merton, Horning, Barton Broad*, abundant near *Lynn*; probably everywhere in wet places among *Typha latifolia*
- *neurica*, Hb. *Yarmouth, Aldeby, Merton, Ranworth, Horning*; probably in all the fens, but of obscure and secret habits, and rarely taken except at 'light'
- Cœnobia rufa*, Haw. (despecta, Stn.). Probably in all the fens, flying plentifully at sunset over coarse grasses and herbage in the more open portions. Found even in small isolated marshes
- Tapinostola fulva*, Hb. Moderately common in all the fens, and also in damp woods
- *helmanni*, Evers. There is a record of a single specimen taken many years ago at *Yarmouth*. As a constant inhabitant of the fens of Cambridgeshire, its apparent absence from those of this county is especially noticeable
- *elymi*, Tr. *Caistor, near Yarmouth, Hunstanton, Snettisham*; on the coast among *Elymus arenarius*
- Calamia lutosa*, Hb. *Norwich, Yarmouth, Aldeby, Lynn, Horning, Neatishead*; in the fens, and also especially frequenting the broad ditches which drain marshy tracts near the sea
- *phragmitidis*, Hb. Like the last, frequenting the fens, and also drains and ditches where reeds abound; common
- *brevilinea*, Fenn. *Horning, Ranworth*, and other portions of the fens of the *Bure* and its affluents. The first known specimen was taken at *Ranworth* in 1864, by Mr. Chas. Fenn, and for some years it remained unique, but gradually the species appears to have become established, and has increased in numbers to such an extent that thirty specimens have been taken at 'light' in a single night, and the insect has become well known. It does not however appear to have spread more than a few miles; has not been found in any other British locality; and has been taken once only abroad—in *Belgium*
- Meliana flammea*, Curt. *Merton, Brandon*; rare; much more plentiful in the

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- neighbourhood of *Barton Broad* and in the fens of the *Bure*
- Leucania pudorina*, Sch. *Aldeby, Merton, Ketteringham, Cawston, Lynn, Ranworth*; probably in the outer portions of all fens and in many damp woods
- *straminea*, Tr. In all the fens, sometimes commonly
- *obsoleta*, Hb. Very scarce in the fens, noticed at *Horning*, and also at *Merton* and *Cawston*
- *littoralis*, Curt. *Yarmouth, Caistor, Horsey, Hunstanton*; frequent on sandy coasts among *Ammophila arundinacea*
- *conigera*, Sch. Generally common
- *lithargyria*, Esp. Widely distributed, doubtless in all woods
- *turca*, Linn. Recorded at *Foulsham* by the Rev. T. H. Marsh
- Panolis piniperda*, Esp. In all fir woods; sometimes common
- Tæniocampa miniosa*, Sch. Taken by Mr. F. Norgate in *Foxley Wood*
- *populeti*, Fab. *Gillingham, Cawston*; scarce. Mr. Atmore found its larva commonly near *Lynn* in 1897
- *instabilis*, Sch. Generally common
- *munda*, Sch. *Aldeby, Thetford, Cawston, Lynn*; not common
- *gracilis*, Sch. *Norwich, Aldeby, Thetford, Cawston, Lynn*; not rare in marshes
- Pachnobia rubricosa*, Sch. *Norwich, Aldeby, Beachamwell, Sparham, Cawston, Lynn*; not uncommon
- Rusina tenebrosa*, Hb. *Norwich, Merton, Aldeby, Cawston, Lynn*; not very common in this county
- Mania maura*, Linn. *Norwich, Aldeby, Merton, Thetford, Sparham, Lynn, Horning*; tolerably common
- Amphipyra pyramidea*, Linn. *Norwich, Yarmouth, Broome, Merton, Thetford, Ketteringham, Lynn*; very local; abundant in some seasons
- Toxocampa pastinum*, Tr. *Merton, Thetford, Aldeby, Cawston, Neatishead*, rather common near *Lynn*
- Hydrilla palustris*, Hb. A single specimen fell into my hands at a gas lamp in the outskirts of *Norwich* in June, 1869. I know of no other capture in the county. It is always rare, but occasionally taken in the Cambridgeshire fens
- *arcuosa*, Haw. *Norwich, Thetford, Foulsham*; not common
- Caradrina morpheus*, Hufn. *Norwich, Aldeby, Merton, Thetford, Lynn, Cawston, Horning*; common
- *alsines*, Bkh. *Norwich, Aldeby, Merton, Foxley, Cawston, Lynn, Neatishead, Horning*; not very common
- Grammesia trilinea*, Sch. *Norwich, Aldeby, Merton, Thetford, Wootton, Cawston*; apparently not common
- Dyschorista ypsilon*, Sch. Generally common among willows
- *suspecta*, Hb. *Norwich, Thetford, Cawston, Lynn*; scarce
- Euperia fulvago*, Sch. Taken at *Tivetshall* by Mr. Upcher
- Calymnia diffinis*, Linn. *Merton, Gillingham, Thetford, Lynn, Cawston, Ketteringham, Kimberley*; local among elms
- *affinis*, Linn. *Norwich, Gillingham, Thetford, Lynn, Cawston, Ketteringham, Neatishead*; not common
- Tethea subtusa*, Sch. *Norwich, Cawston, Lynn, Croxton*
- *retusa*, Linn. *Merton, Hingham, Horning, Ranworth*; scarce
- Orthosia rufina*, Linn. (*helvola*, St. C.). *Norwich, Stratton Strawless, Kirby Cane, Thetford, Cawston*
- *lunosa*, Haw. *Norwich, Cawston, Thetford, Kirby Cane*
- *litura*, Linn. Generally distributed
- *lota*, Linn. *Norwich, Kirby Cane, Thetford, Cawston*; common
- *macilenta*, Hb. In the same localities; sometimes common
- Cirrædia xerampelina*, Hb. *Norwich, Gillingham, Merton, Thetford, Cawston, Lynn, Castle Rising*; very scarce
- Xanthia citrago*, Linn. *Norwich, Kirby Cane, Denton, Cawston*; very local
- *cerago*, Sch. Generally distributed
- *silago*, Hb. *Norwich, Kirby Cane, Merton, Thetford, Cawston, Sparham, Wootton*; not very common, more plentiful in *Foxley Wood*
- *aurago*, Sch. *Norwich, Aldeby, Kirby Cane*; very local and scarce
- *gilvago*, Esp. *Norwich, Denton, Merton, Thetford, Croxton, Lynn, Mintlyn, Sheringham*; a very local species, but not scarce in this county
- Cerastis ligula*, Esp. (*spadicea*, Stn.). Generally distributed
- Scopelosoma satellitia*, Linn. Generally common
- Xylina rhizolitha*, Sch. *Norwich, Reepham, Kirby Cane, Thetford, Cawston, Sparham, Sall, Foxley, Hockering, Whitwell*; in woods, occasionally
- Xylocampa lithoriza*, Bkh. *Norwich, Horsford, Coltishall, Merton, Thetford, Lynn, Cawston, Sparham*; not common
- Calocampa exoleta*, Linn. Widely distributed, but not common

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- Calocampa vetusta*, Hb. *Thetford, Cawston*; scarce
- Cucullia verbasci*, Linn. Probably wherever in the county *Verbascum thapsus* and *V. pulverulentum* are found; rarely seen except in the larva state
- *scrophulariæ*, Sch. Excessively rare, but a few specimens have been reared by Dr. F. D. Wheeler from larvæ found at *Bramerton*, and by the Rev. H. Williams from some found near *Croxton*, upon *Verbascum*
- *lychnitis*, Ramb. Found by Dr. W. M. Crowfoot at *Aldeby*; rare
- *asteris*, Sch. Stephens stated that this species occurred in Norfolk, but gave no locality. I took it sparingly at *King's Lynn*, and also found its larva feeding on *Aster tripolium* in salt marshes
- *chamomillæ*, Sch. *Norwich*, one specimen; several more obtained at *Cromer* by Mr. W. H. Thornthwaite
- *umbratica*, Linn. *Norwich, Yarmouth, Broome, Merton, Thetford, Lynn, Horning*; not very common
- Plusia chryson*, Esp. (*orichalcea*, Stn.). Curtis (*British Entomology*) says that this species was taken at *Hethersett*. I know of no more recent capture in the county; yet it is constantly obtained in Cambridgeshire
- *chrysitis*, Linn. Generally common
- *moneta*, Fab. This beautiful and most interesting species was discovered in the south of England—evidently then a migrant from the Continent—in the year 1870. From that time it has gradually spread and increased in numbers and in area of distribution, and in June, 1894, a specimen was captured at *Sprowston, Norwich*, by Mr. Eric Tillet. The following year another was taken in the same place by Mr. B. C. Tillet, and subsequently others, at *Norwich*, by Messrs. Hinde and Pitman
- *festucæ*, Linn. In fens and wet meadows generally, flying before sunset at the flowers of *Lythrum salicaria* and *Iris pseudacorus*
- *iota*, Linn. Widely distributed, but not common
- *pulchrina*, Haw. (v—aureum, Gn.). *Norwich, Denton, Aldeby, Hingham, Cawston, Sparham, Foxley*; scarce
- Habrostola urticæ*, Hb. Generally distributed
- *triplasia*, Linn. *Thetford, Cawston, Hemsby, Horning*; scarce
- Chariclea marginata*, Fab. *Caistor, Cromer, Sparham, Whitwell, Foxley, Merton*; scarce
- Heliothis armigera*, Hub. *Cromer, Holkham, Yarmouth*; rare
- *peltigera*, Sch. One taken at *Cromer* in 1875, and three more in 1884; rare
- *dipsacea*, Linn. *Yarmouth, Denton, Merton, Thetford, Brandon, Barton Bendish, Lynn*; most frequent upon the 'Breck-sand,' where it flies about fields of *Onobrychis*, *Anthyllis*, and other cultivated Papilionaceous plants. Also reared from larvæ found on *Linaria*, *Daucus*, and other flowers
- *scutosa*, Schl. Two specimens were obtained at 'light' at *Cromer* by Mr. W. H. Thornthwaite in 1875. One of these is in my possession. Another, in the collection of Dr. Mason, is labelled 'Captured by A. Coburn, flying in the sunshine, 24th June, 1880, near *Attleburgh*.' The insect is excessively rare with us
- Heliodes arbuti*, Fab. *Croxton, Denton, Broome, Cawston*; rather common near *Lynn*
- Acontia luctuosa*, Sch. *Merton, Thetford, Brandon*; confined, in this county, to the 'Breck' district, where it frequents fields of sainfoin and trifolium
- Hydrelia argentula*, Esp. Curtis (*British Entomology*) says, 'Taken at the end of June among reeds and rushes in bogs in *Norfolk* by Mr. Haworth.' A similar statement is made by Wood (*Index Entomologicus*), and by Westwood (*British Moths and their Transformations*). But Mr. Haworth did not himself mention this in the *Lepidoptera Britannica*, whence it seems probable that his captures of this species were subsequent to the publication of his great work. In a copy thereof, which formerly belonged to Mr. N. A. Vigers, is this statement in his own handwriting: 'A pair were given to me by Mr. Haworth which were taken in *Norfolk*.' The locality in *Norfolk* is understood to have been *Beachamwell*, but I can find no evidence of the existence of this species there since the time of Haworth—quite early in the present century. But I find that specimens were taken at *Stoke Ferry* by Mr. W. T. Cross of Ely within the last four years. Elsewhere it is an extraordinarily local species, but it is common in one of the Cambridgeshire fens
- Hydrelia uncana*, Linn. *Aldeby, Merton,*

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- Surlingham, Hoveton, Horning, Ranworth, Cawston, Wormegay*; confined to the fens and marshes, but in them sometimes common
- Agrophila sulphuralis*, Sch. *Merton, Didlington, Croxton, Thetford, Brandon*; plentiful in the 'Breck' district among *Convolvulus arvensis*, not only in this county, but in *Suffolk* and *Cambridgeshire*. Very rare elsewhere in the British Isles
- Erastria fuscula*, Sch. *St. Faiths, near Norwich, Merton, Foulsham, Foxley*; in woods, usually of fir
- Bryophila glandifera*, Sch. Lord Walsingham has recorded the capture of a single specimen on the *Merton* estate
- *perla*, Sch. Abundant everywhere on walls
- Phytometra ænea*, Sch. *Merton, Holt Heath, Cawston, Wootton, Lynn, Horsford*; not very common
- Anarta myrtilli*, Linn. Generally distributed on heaths
- Sarrothripa revayana*, Sch. *Merton, Croxton, Felbrigge, Horsford, Cawston, Lynn*; in woods, scarce
- Gonoptera libatrix*, Linn. Generally common
- Ophiodes lunaris*, Sch. A single specimen of this, one of the rarest of British species, was captured at 'light' at *Stratton Strawless*, in 1878, by Dr. F. D. Wheeler
- Catocala fraxini*, Linn. Lord Walsingham has recorded the capture of a specimen of this noble species at *Holkham*; and the Rev. T. H. Marsh of another at *Cawston*. Dr. Paget noted the occurrence of an example at *Yarmouth*, and another has been taken at *Hunstanton*. The capture by Dr. E. W. Carlier of a fine specimen near *Norwich*, in 1894, was rendered less satisfactory by the discovery that two specimens reared that season in *Norwich* from foreign larvæ had accidentally escaped
- *nupta*, Linn. Generally distributed wherever willows abound
- *promissa*, Sch. *Foxley, Foulsham*, and once at *Hethersett*; an exceedingly local species
- Euclidia mi*, Linn. Widely distributed in meadows, but not common
- *glyphica*, Linn. *Aldeby, Merton, Cawston, Heydon, Horning, Neatishead*; not common
- Aventia flexula*, Fab. *Norwich, Chedgrave, Merton, Thetford, Neatishead, Hingham*, and the *Lynn* district; very uncommon
- Herminia barbalis*, Linn. *Foulsham, Cawston, Horning, Denton, Castle Rising, Lynn*
- *tarsipennalis*, Tr. Generally distributed
- *grisealis*, Sch. Widely distributed; not very common
- *cribralis*, Hb. *Ranworth, Horning, Lynn, Merton, Aldeby, Diss*; very local in fens and marshes
- Hypenodes albistrigalis*, Haw. *Aldeby, Merton, Ranworth*; usually in fens
- *cortæstrigalis*, Steph. *Merton, Cawston, Horning, Ranworth*; scarce; more frequent on the boggy heaths near *Lynn*
- Schrankia turfosalis*, Wock. Very abundant at *Wootton, Bawsey* and elsewhere on boggy heaths in the *Lynn* district
- Hypena rostralis*, Linn. *Norwich, Aldeby, Thetford, Horning, Lynn*; not very common
- Rivula sericealis*, Sch. Widely distributed in marshes and damp woods
- Brephos parthenias*, Linn. *Thetford, Neatishead*, heaths near *Lynn*; very local
- *notha*, Hb. Has been taken at *Horsford* near *Norwich*
- Ourapteryx sambucata*, Linn. Common generally
- Angerona prunaria*, Linn. *Aldeby, Denton, Foxley, Foulsham, Lynn*; in large woods
- Venilia maculata*, Linn. *Merton, Haveringland, Cawston, Horning*; very local
- Cabera pusaria*, Linn. Mr. Atmore has succeeded in uniting this species with its variety *rotundaria* by rearing both
- Bapta temerata*, Sch. *Norwich, Ketteringham, Merton, Yarmouth, Neatishead, Cawston, Lynn*; not very common
- *taminata*, Sch. *Norwich, Merton, Thetford, Cawston, Sheringham, Lynn*; most frequent in *West Norfolk*, and in certain seasons abundant
- Macaria liturata*, Linn. Generally distributed in woods of Scotch fir
- Panagra petraria*, Hb. Generally common among brake-fern on heaths; a singularly pale variety has been found in *Ranworth* fen
- Strenia clathrata*, Linn. Generally distributed, and common in clover fields; variable in colour in this county
- Fidonia piniaria*, Linn. Abundant in all woods of Scotch fir
- Numeria pulveraria*, Linn. *Cawston, Foulsham, Hingham*
- Aspilates strigillaria*, Hb. *Horning*; scarce
- *citraria*, Hb. *Norwich, Merton, Thetford, Brandon, Hunstanton, Snettisham*; common in open fields in the 'Breck' district

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- Eurymene dolobriaria*, Linn. *Norwich, Costessey, Merton, Thetford, Aldeby, Foxley, Cawston, Wootton, Neatishead, Swaffham, Lynn*; always scarce
- Odontoptera bidentata*, Linn. *Norwich, Aldeby, Merton, Thetford, Cawston, Lynn*; not very common
- Ennomos alniaria*, Linn. (*tiliaria*, Stn.). *Norwich, Merton, Thetford, Lynn, Sparham, Ranworth, Neatishead*; frequent where alders grow in the neighbourhood of fens
- *fuscantaria*, Haw. *Norwich, Lynn, Denton*; scarce; more common in the fens which line the *Bure*
- *erosaria*, Sch. *Norwich, Merton, Denton, Brandon, Cawston, Lynn*; scarce; also more frequent in the fens of the *Bure*
- *angularia*, Sch. (*quercinaria*, St. C.). *Norwich, Merton, Thetford, Cawston, Lynn*; not common
- Crocallis elinguaris*, Linn. Widely distributed
- Himera pennaria*, Linn. *Norwich, Yarmouth, Merton, Thetford, Cawston, Lynn*
- Selenia illustraria*, Hb. *Thetford, Lynn, Barton Bendish*; scarce
- *lunaria*, Sch. *Merton*; once taken at *Norwich* by Dr. Wheeler
- Pericallia syringaria*, Linn. Widely distributed, but not very common
- Epione apiciaria*, Sch. Generally distributed; abundant in the fens
- *vespertina*, Linn. Very rare; single specimens are said to have been captured at *Cawston* and *Neatishead*
- Ellopiia fasciaria*, Linn. In all woods of Scotch fir
- Biston hirtarius*, Linn. Common at *Norwich*; found at *Denton, Lynn, Watton, Cawston, Raveningham*; but more rarely
- *prodromarius*, Sch. *Norwich, Thetford, Lynn, Sall, Cawston, Raveningham*; not common
- *betularius*, Linn. Generally distributed; the black variety made its appearance in this county about seven years ago, but is still rare
- Phigalia pilosaria*, Sch. *Norwich, Sparham, Cawston, Raveningham, Lynn, Wootton*; not very common
- Gnophos obscurata*, Sch. *Merton, Barton, Northwold, Yarmouth*; scarce
- Cleora lichenaria*, Sch. Generally distributed
- Tephrosia biundularia*, Esp. *Horsford, Stratton Strawless, Foulsham, Lynn*; not common
- *extersaria*, Hb. *Foxley Wood*
- Tephrosia punctularia*, Sch. *Merton, Gillingham, Wootton, Foulsham, Lynn*; not common
- Boarmia rhomboidaria*, Sch. Everywhere common; a beautiful black variety is found, not very rarely, at *Norwich*
- Hemerophila abruptaria*, Thunb. *Norwich, Merton, Thetford, Cawston, Wootton, Lynn*; not very common
- Hibernia aurantiaria*, Hb. *Norwich, Merton, Thetford, Aldeby, Cawston*
- *leucophæaria*, Sch. In the same localities; not common
- *rupicapraris*, Sch. Probably everywhere in hedges
- Abraxas ulmata*, Fab. *Merton, Ketteringham, Aylsham, Mintlyn, Lynn*; scarce; much more common at *Castle Rising* and at *Sheringham*
- Ligdia adustata*, Sch. *Norwich, Aldeby, Merton, Thetford, Horning, Cawston*; common in lanes on the chalk
- Pseudoterpna cytisaria*, Sch. On heaths among furze and broom, commonly; also in waste places on the coast
- Geometra papilionaria*, Linn. *Norwich, Surlingham, Merton, Gillingham, Thetford, Cawston, Irstead, Ranworth, Lynn*; rather frequent in the fens wherever birch and alder are in plenty
- Iodis vernaria*, Linn. *Denton, Yarmouth*; rare
- Nemoria viridata*, Linn. *Horning*, four specimens taken in 1873. It does not seem to have been noticed in the county since that date
- Phorodesma bajularia*, Sch. *Merton, Denton, Foxley, Foulsham, Lynn*; not common
- Hemithia thymiaria*, Linn. (*strigata*, St. C.). Generally common
- Ephyra porata*, Linn. *Lynn, Brandon, Horning*; scarce
- *punctaria*, Linn. Generally distributed, but not common
- *trilinearia*, Bkh. *Merton, Croxton, Stratton Strawless*
- *omicronaria*, Sch. Generally distributed among maple
- *pendularia*, Linn. *Foulsham, Wootton*; common near *Lynn*
- Hyria auroraria*, Gn. (*muricata*, St. C.). *Merton, Aldeby, Cawston, Hingham, Hoveton, Neatishead, Ranworth, Horning, near Lynn*; rather common in some portions of the fens
- Acidalia rubricata*, Sch. (*rubiginata*, St. C.). *Norwich, Merton, Brandon, Thetford, Cawston, St. Faiths, Mintlyn, Lynn*; very common in open fallow fields, and in lucerne fields, in the 'Breck' dis-

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- trict; extending in very far smaller numbers and in darker colour on to some of the boggy heaths; and occurring casually elsewhere. Except in this and the adjoining eastern counties, a great rarity
- Acidalia dilutaria*, Hb. (interjectaria, Bdv.; osseata, Stn.). Generally common
- *holosericata*, Dup. A single specimen of this very local species was taken some years ago by the Rev. H. Williams near *Thetford*; the presence here of this one specimen seems inexplicable, except on the supposition that others are sometimes mistaken for the preceding species
- *promutata*, Gn. (*marginepunctata*, St. C.). *Norwich* suburbs; *Merton*, *Aldeby*, *Yarmouth*, *Brandon*, *Lexiate*; locally common
- *ornata*, Scop. *Merton*, *Wood Dalling*; local and scarce
- *subsericeata*, Haw. *Norwich*, *St. Faiths*; common at *Stratton Strawless*; *Merton*, *Thetford*, *Barton*, *Lynn*; usually not very common
- *immutata*, Linn. Abundant in all the fens; and found in many other marshy spots
- *remutata*, Hb. In woods and on wooded heaths, but less abundant than usual
- *inornata*, Haw. *Merton*, *Denton*, *Brandon*, *Wootton*; rather local
- Timandra emutaria*, Hb. *Lynn*, *Wootton*, *Croxton*; a scarce species, more particularly attached to salt marshes
- *imitaria*, Hb. Generally distributed; most frequent on the coast
- Bradyepetes amataria*, Linn. Widely distributed, but not very common
- Ania emarginata*, Linn. Generally distributed; rather common in the fens
- Melanippe rivata*, Hb. *Lynn*, *Denton*; scarce
- *galiata*, Sch. Said to occur rarely at *Cawston* and *Horning*
- Melanthia rubiginata*, Sch. In damp woods and fens among alder; common
- *ocellata*, Linn. Generally distributed
- *albicillata*, Linn. *Norwich*, *Aldeby*, *Ormesby*, *Neatishead*, *Horning*, *Barton Bendish*, *Mintlyn*; not common
- *procellata*, Sch. *Norwich*, *Aldeby*, *Denton*, *Cawston*; scarce
- *unangulata*, Haw. *Norwich*, *Merton*, *Aldeby*, *Denton*, *Cawston*, *Lynn*; not plentiful
- Anticlea sinuata*, Sch. (*cucullata*, St. C.). *Brandon*, *Thetford*, *Beachamwell*; very scarce
- *rubidata*, Sch. *Aldeby*, *Denton*, *Merton*, *Thetford*, *Brandon*, *Cawston*, near *Lynn*; not common
- Anticlea derivata*, Sch. (*nigrofasciaria*, St. C.). *Norwich*, *Aldeby*, *Denton*
- *berberata*, Sch. *Brandon*, formerly at *Beachamwell*
- Coremia propugnata*, Sch. (*designata*, St. C.). *Norwich*, *Merton*, *Aldeby*, *Cawston*, *Horning*, *Ranworth*; not common
- *quadrifasciaria*, Linn. *Norwich*, *Aldeby*, *Denton*, *Merton*, *Cromer*, *Cawston*, *Barton*, *Wootton*; not common, but more generally distributed in the woods of *West Norfolk*
- *pectinitaria*, Fuess. *Norwich*, *Horsford*, near *Beccles*, *Merton*, *Ranworth*; very local here
- *multistrigaria*, Haw. *Norwich*, *Yarmouth*, *Merton*, *Thetford*, *Cawston*, *Neatishead*, *Lynn*; on heaths
- Asthena luteata*, Sch. *Norwich*, *Costessey*, *Denton*, *Barton*, *Cawston*, *Wootton*, *Mintlyn*; among maple
- *candidata*, Sch. Widely distributed, but not plentiful
- *sylvata*, Sch. (*testacea*, St. C.). *Foxley*, *Foulsham*; scarce
- Eupisteria heparata*, Sch. (*obliterata*, St. C.). Generally common among alder
- Emmelesia affinitata*, Steph. *Merton*, *Cawston*, *Horning*, *Wootton*; more common at *Castle Rising* and *Lynn*
- *alchemillata*, Linn. Widely distributed, but not very common
- *albulata*, Sch. Generally distributed in meadows among *Rhinanthus*
- *decolorata*, Hb. Widely distributed among *Lychnis vespertina*
- *unifasciata*, Haw. *Hingham*, *Lynn*, *Denton*; scarce
- Cidaria psittacata*, Sch. *Thetford*, *Castle Rising*; scarce
- *miata*, Linn. *Norwich*, *Yarmouth*, *Aldeby*, *Buxton*, *Cawston*, *Lynn*; not uncommon
- *corylata*, Thunb. Generally distributed
- *picata*, Hb. *Merton*, *Aldeby*, *Cawston*, *Ketteringham*
- *sagittata*, Fab. *Norwich*, *Brundall*, *Aldeby*, *Thetford*, *Stoke Ferry*; among *Thalictrum*, in fens
- *immanata*, Haw. Generally common
- *suffumata*, Sch. *Norwich*, *Aldeby*, *Denton*, *Cawston*, *Lynn*; not common
- *silacea*, Sch. *Norwich*, *Costessey*, *Foxley*, *Aldeby*, *Cawston*, *Foulsham*, *Lynn*; in moist woods; not common
- *prunata*, Linn. Generally distributed in gardens, but not common
- *dotata*, Linn. *Norwich*, *Yarmouth*, *Aldeby*, *Lynn*, *Horning*; not common

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- Cidaria pyraliata*, Bkh. *Norwich, Aldeby, Cawston, Horning, Lynn*
 — *populata*, Bkh. *Cawston, Barton Bendish, Lynn*; on heaths, very scarce, but reliable
 — *testata*, Linn. Everywhere common, but especially so in the fens
Pelurga comitata, Linn. *Norwich, Yarmouth, Aldeby, Thetford, Brandon, Lynn, Cawston, Horning*; common in this county
Scotosia vetulata, Sch. *Surlingham, Aldeby, Thetford, Denton, Horning, Ranworth, Lynn*; among buckthorn in wet copses in the fens
 — *rhamnata*, Sch. *Norwich, Merton, Thetford, Ranworth, Horning*; in similar situations to the last named
 — *undulata*, Linn. *Kings Lynn, Denton, Aldeby, Merton, Foulsham, Foxley, Barton Bendish*; not common
 — *dubitata*, Linn. *Norwich, Aldeby, Merton, Cawston, Ranworth, Lynn*; not very common
 — *certata*, Hb. *Norwich, Thetford, Cawston*; scarce
Phibalapterya fluviata, Hb. *Horning, Foulsham*; very rare
 — *lignata*, Hb. (*vittata*, St. C.). *Norwich, Brundall, Aldeby, Merton, Thetford, Brandon, Cromer, Ranworth*; especially in fens and the meadows bordering them
 — *tersata*, Sch. *Denton, Ditchingham, Thetford, Foulsham*; local and scarce
Thera firmaria, Hb. *Norwich, Horsford, Plumstead, Hevingham, Thetford, Cawston, Lynn*; among fir
Hysipetes ruberata, Frey (*literata*, St. C.). *Kilveston, West Tofts, West Walton, Walsoken and Lynn*; not very common
 — *impluviata*, Sch. Generally distributed among alder
Oporabia dilutata, Sch. *Norwich, Merton, near Beccles, Cawston*; probably in all woods
Cheimatobia boreata, Hb. *Narborough*; once taken
Lobophora lobulata, Hb. *Lynn, Croxton*; scarce
 — *hexapterata*, Sch. *Barton Bendish*; extremely local
 — *sexalata*, Hb. *Norwich, Surlingham, Aldeby, Geldestone, Merton, Foulsham, Horning, Ranworth, Lynn*; not scarce in fens and marshes, among sallow; sometimes sitting on the stems in the daytime among the thickest herbage
 — *viretata*, Hb. *Geldeston, Ketteringham, Neatishead*; scarce
Lithostege nivearia, Sch. (*farinata*, St. C.; non *griseata*, Sch.). *Brandon, Thetford*; only very locally in the 'Breck' district; among *Sisymbrium sophia* and *S. cheiranthoides*
Chesias spartiata, Fab. *Norwich, Denton, Aldeby, Merton, Thetford*, common near *Lynn*; among *Spartium scoparium* (broom)
 — *obliquaria*, Sch. *Norwich, Thetford, Lynn*; among the same food-plant as the last
Anaitis plagiata, Linn. Generally common
Mesotype lineolata, Sch. (*virgata*, St. C.). *Yarmouth and Cawston sandhills, Cromer*; also occasionally to be found still lingering on the 'Breck-sand' around *Thetford*
Eubolia palumbaria, Sch. Generally common on heaths
 — *bipunctaria*, Sch. *Brandon, Merton*, scarce; said to have been taken at *Horsford*
 — *cervinata*, Sch. *Norwich, Yarmouth, Kirby Cane, Thetford, Cawston, Lynn*; not scarce
 — *mensuraria*, Sch. (*limitata*, St. C.). *Norwich, Gillingham, Merton, Thetford, Ranworth*; by no means so plentiful as is usually the case
Collix sparsata, Hb. *Surlingham, Aldeby, Shadwell, Ranworth, Horning, Barton Turf, Stoke Ferry, Lynn*; probably in all the fens
Eupithecia venosata, Fab. *Norwich, Horsford, Merton, Denton, Thetford, Cawston, Barton, Lynn*; among *Silene inflata*
 — *consignata*, Bkh. (*insignata*, St. C.). *Norwich, Shadwell*; very rare
 — *extensaria*, Frr. On the coast, usually at the edges of salt marshes, from *Lynn* to *Hunstanton* and *Wells*; the larva feeding on the blossoms of *Artemesia maritima*. The first specimen was taken by my eldest son in July, 1887, and Mr. Atmore subsequently took others and also larvæ. It is a species which appears to have migrated to this coast from the Baltic, and the only previous British specimens known had been taken on the coast of Yorkshire. It has now so increased in numbers in Norfolk that almost every cabinet is supplied
 — *pulchellata*, Steph. *Lynn, Croxton*; not common
 — *linariata*, Sch. *Norwich, Merton, Thetford, Brandon, Cawston, Lynn*; common among *Linaria vulgaris*
 — *centaureata*, Sch. (*oblongata*, St. C.). Widely distributed, especially in gardens and waste ground

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- Eupithecia succenturiata*, Linn. *Norwich, Aldeby, Denton, Croxton, Hingham, Wootton, Hunstanton*
- *subfulvata*, Haw. *Norwich, St. Faiths, Ketteringham, Aldeby, Merton, Thetford, Lynn, Ranworth*; not scarce
- *subumbrata*, Sch. Taken near Stoke Ferry in July, 1891, by Mr. W. T. Cross
- *irriguata*, Hb. *Hunstanton, Merton, Denton*; rare
- *indigata*, Hb. *Horsford, Cawston, Mintlyn*; in fir woods
- *lariceata*, Frr. *Merton, Shouldham, Mintlyn, Sherringham, Denton*; in larch woods
- *virgaureata*, Dbld. *Horning*; apparently scarce
- *albipunctata*, Haw. *Horning, Lynn*; among *Angelica*
- *pimpinellata*, Hb. *Wells*; very local
- *satyrata*, Hb. Found near *Lynn* by Mr. E. A. Atmore
- *plumbeolata*, Haw. *Lynn, Denton*; scarce
- *isogrammata*, H.S. (*haworthiata*, Dbld.). *Lynn*; among *Clematis*
- *pygmæata*, Hb. *Lakenham* near *Norwich, Stoke Ferry*; found commonly by Mr. Atmore at *Wormegay* and *Bawsey* near *Lynn*
- *valerianata*, Hb. (*viminata*, Dbld.). *Norwich, Brundall, Merton, Ranworth*; in fens and marshes among *Valeriana*
- *fraxinata*, Crewe. *Norwich, Yarmouth, Lynn, Horning*; among ash
- *subnotata*, Hb. *Lynn, Wootton*; apparently not common
- *campanulata*, Crewe. *Merton*; rare
- *absynthiata*, Linn. *Aldeby, Merton, Cawston, Hingham, Horning*; local
- *minutata*, Hb. *Norwich, St. Faiths, Brandon, Cawston, Lynn*; common on heaths
- *assimilata*, Dbld. *Norwich, Lynn, Cawston, Hingham*; in gardens
- *tenuiata*, Hb. Common about tallows in fens and marshes
- *subciliata*, Gn. *Denton, Gillingham, Thetford, Cawston*; among maple
- *dodoneata*, Gn. *Lynn, Thetford*; among hawthorn and oak
- *abbreviata*, Steph. *Norwich, St. Faiths, Denton, Runton, Aldeby, Cawston, Lynn*; in oak woods
- *exiguata*, Hb. *Norwich, Aldeby, Lynn, Bawsey*; not very common
- *sobrinata*, Hb. *Norwich, Merton, Thetford, Brandon*
- *coronata*, Hb. *Merton, Aldeby, Hingham, Cawston, Horning, Lynn*
- *pumilata*, Hb. *Norwich, St. Faiths, Cawston*; apparently not common
- Pyralis fimbrialis*, Sch. *Merton, Cawston, Horning*; scarce
- *glauca*, Linn. Generally distributed
- Pyrausta punicealis*, Sch. *Ringstead Downs*
- *ostrinalis*, Hb. *Kings Lynn*; not common
- *purpuralis*, Linn. Generally distributed
- Herbula cespitalis*, Sch. Widely distributed in sandy places
- Endotricha flammealis*, Sch. *Norwich, Merton*; more frequent in the *Lynn* district
- Acentropus niveus*, Oliv. *Brandon, Merton, Ranworth, Barton Broad*; plentiful near *Lynn*
- Cataclysta lemmalis*, Linn. *Paraponyx stratiotalis*, Linn.; *Hydrocampa nymphæalis*, Linn.; and *H. stagnalis*, Don. All common about rivers, broads, and fen-drains
- Botys pandalis*, H. S. *Merton*; taken by Lord Walsingham
- *hyalinalis*, Hb. *Merton, Thetford*, scarce
- *lancealis*, Sch. *Beachamwell, Aldeby, Barton Bendish, Lynn* district; in marshy woods, local
- *fuscalis*, Sch. Generally distributed where yellow rattle grows in meadows, sometimes also in marshes
- Ebulea crocealis*, Tr. *Norwich, Gillingham, Thetford, Cawston, Barton, Hunstanton, Lynn*; among *Inula dysenterica*
- *verbascalis*, Sch. *Plumstead, St. Faiths, Aldeby, Croxton, Cawston, the Lynn* district, among *Teucrium scorodonia*
- *stachydalis*, Zinck. Taken at *Denton* by the Rev. C. T. Cruttwell
- Lemiodes pulveralis*, Hb. On July 27th, 1870, I captured a single specimen of this rare species upon the embankment of one of the drains at *Ranworth Fen*. So far as I know no other specimen has ever been taken in *Norfolk*, or indeed in any part of the United Kingdom except on the extreme south coast; and the occurrence of this single example, which I still possess, is to me inexplicable
- Pionea margaritalis*, Fab. Recorded at *Beachamwell* by Stephens and Curtis, but I know of no recent captures here
- *stramentalis*, Hb. Very widely distributed in fens and marshes
- Margarodes unionalis*, Hb. A single specimen of this rarity was captured at *Yarmouth* on June 15th, 1880, by Mrs. Wheeler. It was sitting upon a grass-culm on the sandhills. It has been placed by Dr. F. D. Wheeler in my collection
- Spilodes sticticalis*, Linn. *Merton, Thetford, Brandon, Beachamwell, Hunstanton*; rather common in the 'Breck' district

INSECTS

- Spilodes palealis*, Sch. In the year 1875 this species was obtained at *Croxton, Thetford, Boston*, and *Barton Bendish*, confirming the records of Curtis, Stephens and Wood of its presence in the county; so far as I know none have been observed since; and the species has become very scarce in the British Isles
- *cinctalis*, Tr. Generally distributed; occurring in clover fields
- Scopula lutealis*, Haw. *Norwich, Aldeby, Ketteringham, Lynn, Cawston*
- *ferrugalis*, Hb. Widely distributed, and occasionally common
- Eudorea basistrigalis*, Knaggs. *Norwich, Aldeby, Denton*; scarce
- *cembrae*, Haw. *Norwich, Aldeby, Wootton, Cawston, Hunstanton*
- *dubitalis*, Hb. (*pyralis*, Sch.) abundant; its pretty variety *ingratella* has been taken at *Brandon* and *Hingham*
- *lineola*, Curt. *Norwich, Croxton, Hingham, Denton*; very local
- *cratægella*, Hb. *Norwich, Cawston, Brandon*, near *Lynn*, not common
- *resinea*, Haw. *Norwich, Denton*, very local
- *truncicolella*, Stn. *Norwich, Horsford, Cawston*; abundant near *Lynn*, upon trunks of Scotch firs
- *coarctalis*, Z. (*angustea*, Curt.). *Norwich, Denton, Lynn*
- *pallida*, Curt. Abundant in fens and marshes
- Adactyla bennettii*, Curt. *Hunstanton, Lynn*, in salt marshes
- Platyptilia isodactylus*, Z. *Norwich*; among *Senecio aquaticus*, in marshes
- Amblyptilia acanthodactyla*, Hb. *Norwich, Aldeby, Croxton, St. Faiths, Cawston, Cromer, Lynn*
- Oxyptilus teucris*, Greening. *Norwich, Merton, Croxton, Lynn*; local among *Teucrium scorodonia*
- *distans*, Z. *Merton, Thetford, Brandon, Swaffham*; principally upon the 'Breck-sand'; little known elsewhere in the United Kingdom
- *parvidactylus*, Haw. *Croxton*; very local
- Mimæsiptilus phæodactylus*, Hb. *Hunstanton*; taken by Mr. Atmore
- *plagiodactylus*, Fisch. *Norwich, Merton, Croxton*; among *Scabiosa columbaria*
- *zophodactylus*, Dup. *Norwich, Merton, Hunstanton*; among *Erythræa centaureum*
- Ædematophorus lithodactylus*, Tr. *Lynn, Hunstanton*; among *Inula*
- Leioptilus lienigianus*, Z. *Norwich, Ringland, Horning, Lynn*; very local among *Artemisia*
- Leioptilus microdactylus*, Hb. *Merton, Croxton, Ranworth*; among *Eupatorium cannabinum*
- *brachydactylus*, Tr. The only recorded occurrence of this species in Great Britain was in Norfolk; yet the locality is unknown. There seems no reason to doubt Mr. Farr's capture of it, which took place fifty years ago. This specimen was for forty years in the collection of Mr. J. Jenner Weir; and was recorded as British by Mr. H. T. Stainton
- Aciptilia galactodactyla*, Hb. *Norwich, Merton, Denton, Sparham, Foxley, Hockering*; among *Arctium lappa*
- *tetradactyla*, Linn. Taken at *Swaffham* by Mr. Atmore
- Platytes cerusellus*, Sch. *Merton, Brandon, Wootton*; locally abundant
- Crambus alpinellus*, Hb. *Yarmouth, Hunstanton*; on sea sandhills, rare
- *falsellus*, Sch. *Brandon, Cawston, Ranworth, Denton, Lynn*; scarce
- *sylvellus*, Hb. (*adipellus*, Tr.). Not scarce in the fens
- *hamellus*, Thunb. *Croxton, Little Saxton*; frequent on heaths near *Lynn*
- *uliginosellus*, Z. Common in fens and marshes
- *pinetellus*, Linn. Generally distributed, but not very common
- *latistrius*, Haw. *Norwich, Croxton, Cawston*; abundant on the denes near *Yarmouth*, and frequent on the heaths about *Lynn*
- *perllellus*, Scop. Abundant; curious varieties approaching and even actually representing the form known as *C. warringtonellus*, have been taken at *Brandon, Croxton, Hunstanton*, near *Lynn*, and elsewhere
- *selasellus*, Hb. Common in the fens, and in some marshes
- *salinellus*, H. In a salt marsh at *Lynn*
- *contaminellus*, Hb. Taken near *Hunstanton* by Mr. Atmore
- *fascelinellus*, Hb. *Yarmouth, Hunstanton, Heacham*, on the sandhills. So far as I know this handsome species is only found with us in the county of Norfolk
- *chrysonuchellus*, Scop. *Merton, Thetford, Croxton, Brandon, Swaffham, Ringstead*; in chalky places
- Chilo paludellus*, Hb. *Ranworth, Horning*, and other fens, particularly those of the *Bure* and its tributaries. Not known elsewhere in the United Kingdom
- *phragmitellus*, Hb. Common in the fens and marshes

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- Schœnobius forficellus*, Thunb. Generally distributed in weedy ditches and the higher portions of the fen and marsh drains
- *mucronellus*, Scop. *Norwich, Barton Turf, Horning*; abundant at *Ranworth*; found also at *Merton* and near *Lynn*, in fens
- *gigantellus*, Sch. *Diss, Merton, Barton Turf, Horning, Ranworth*; on rivers, and in the deepest fens, among the great reed-beds
- Anerastia lotella*, Hb. *Yarmouth, Caistor, Hunstanton*, on coast sandhills; and also at *Thetford* and *Brandon*, still common on the 'Breck-sand'
- *farrella*, Curt. The original specimens were taken near *Yarmouth* more than sixty years ago by Mr. Farr. His locality was lost at his death shortly after, and the insect was not rediscovered till 1881, when many specimens were secured by Mr. Atmore nearer to *Hunstanton*
- Cateremna terebrella*, Zk. *Merton, Lynn*, among *Pinus abies* (spruce), its larva feeding in the young cones. Discovered by Lord Walsingham, and, so far as I know, not to be found in any other part of the United Kingdom
- Ilithya carnella*, Linn. Once taken near *Horning*; not in the fen
- Myelophila cribrella*, Hb. *Merton, Thetford, Croxton, Brandon*, principally upon the 'Breck-sand.' Larva in the stems of *Onopordon acanthium*
- Homœosoma nimbella*, Dup. *Caistor*, near *Yarmouth*, on the denes; abundant
- *senecionis*, Vaugh. *Norwich, Lynn, Hunstanton*; uncommon
- *nebulella*, Hb. *Norwich, Merton, Croxton, Brandon, Horning, Lynn, Denton*; locally common
- *eluviella*, Gn. *Merton, Brandon*; very local
- Nyctegretes achatinella*, Hb. On the sandhills near *Caistor, Yarmouth*, in the more settled portions, this insect is sometimes common. It is a rare and excessively local species elsewhere in these islands
- Ephestia kuhniella*, Z. This species, which is known to have reached Europe within the last twenty or thirty years, and this country much more recently, has now become common in flour mills and stores in *Norwich, Lynn*, and *Downham*
- *ficulella*, Bar. *Norwich, Lynn*; in seed and oilcake warehouses
- *passulella*, Bar. Common at *Norwich* and *Lynn* in similar places
- Ephestia pinguis*, Haw. *Norwich, Cawston*; on old ash trees
- *artemisiella*, Steph. *Norwich, Lynn*, among *Artemisia*
- Cryptoblabes bistriga*, Haw. *Horning, Shouldham, Lynn*; scarce
- Plodia interpunctella*, Hb. *Norwich, Lynn*; abundant in grain stores
- Phycis carbonariella*, Fisch. *Norwich, Croxton, Lynn*; on heaths
- *betulæ*, Goetz. *Merton*; common among birch near *Lynn*
- *dilutella*, Steph. *Hunstanton*; very local, taken by Mr. G. Balding
- *splendidella*, H.S. *Merton*; one specimen reared from a cone of *Abies*
- *abietella*, Sch. *Norwich, Merton, Croxton, Brandon, Lynn*
- *roborella*, Sch. *Norwich, Horsford, Merton, Croxton, Lynn*
- Pempelia palumbella*, Sch. Generally distributed on heaths
- Rhodophaea formosa*, Haw. *Norwich, Cawston*; scarce
- *consociella*, Hb. Generally distributed in oak woods
- *advenella*, Zinck. *Norwich, Croxton, Cawston, Lynn*; not common
- *marmorea*, Haw. *Norwich, Croxton*; scarce
- *suavella*, Zinck. *Norwich, Horsford, Cawston*; scarce
- *tumidella*, Zinck. *Lynn, Denton*, among oaks
- Oncocera ahenella*, Sch. *Merton, Brandon, Barton Bendish, Swaffham*
- Galleria cereana*, Linn. *Norwich, Thetford, Croxton, Wootton, Sparham*
- Meliphora alveariella*, Gn. *Thetford, Croxton, Denton, Sparham, Lynn*; this and the last named species are both very destructive in beehives
- Corcyra cephalonica*, H.S. Has been found in a grain warehouse at *Lynn* by Mr. Atmore
- Tortrix crataegana*, Hb. *Barton Bendish*; very local
- *decretana*, Tr. *Lynn*; the only known British locality
- *sorbiana*, Hb. Common in oak woods
- *lafauryana*, Rag. *Lynn*, on boggy heaths; among *Myrica gale*; discovered by Mr. Atmore; the only known British locality
- *cinnamomeana*, Tr. *Merton, Easton, Cawston*; scarce
- *corylana*, Hb. Widely distributed in woods
- *costana*, Sch. Generally distributed; very common in the fens

INSECTS

- Tortrix viburnana*, Sch. *St. Faiths, Wootton, Lynn*; on boggy heaths
- *icterana*, Fröhl. *Merton, Aldeby, Hingham, Wootton, Cromer, Lynn*, local
- Dichelia grotiana*, Fab. *Merton, Brandon, Deopham, Hingham, Lynn*
- Leptogramma literana*, Linn. *Merton, Denton, Cawston, Lynn*; scarce
- Peronea sponsana*, Fab. *Merton, Hingham, Norwich*; among beech
- *rufana*, Sch. Taken at *North Wootton* by Mr. Atmore
- *mixtana*, Hb. *Merton, Horsford, Lynn*; on heaths
- *schalleriana*, Linn. Common among *sallow* in fens and marshes
- *comparana*, Hb. *Ketteringham, Ranworth*; not common
- *perplexana*, Bar. *Lynn, Ranworth*
- *comariana*, Z. *Merton, Lynn, Ranworth, St. Faiths*
- *cristana*, Sch. *Merton, Cawston*; scarce
- *hastiana*, Linn. Widely distributed, among *sallow*
- *lorquiniana*, Dup. *Ranworth*; taken in 1878 by Dr. Wheeler and Mr. W. H. B. Fletcher; previously not known nearer than the *Cambridgeshire fens*
- *ferrugana*, Sch. *Norwich, Merton*; not common
- *tristana*, Hub. *Denton*; taken by the Rev. C. T. Cruttwell
- *aspersana*, Hb. Common in fens and marshes
- *shepherdiana*, Steph. *Norwich, Surlingham, Merton, Ranworth, Horning*; in fens and local, but sometimes abundant
- Teras caudana*, Fab. Common in the fens
- Dictyopteryx holmiana*, Linn. Generally common among *hawthorn*
- *forskaleana*, Linn. Widely distributed among *maple*
- Ditula semifasciana*, Haw. *Merton, Ranworth, Horning, Wootton*; not common
- Penthina picana*, Frol. *Merton, Cawston, Costessey, Horning, the Lynn district*
- *betuletana*, Haw. Widely distributed among *birch*
- *capreana*, Hb. Found near *Lynn* by Mr. Atmore
- *prælongana*, Gn. *Merton, Lynn*; scarce
- *ochroleucana*, Hb. *Norwich, Ketteringham, Cawston, Horning, Croxton, Mintlyn*; not common
- *sellana*, Hb. *Croxton, Swaffham*; very local
- *marginana*, Haw. *St. Faiths Bogs, Merton, Cawston, Ranworth*; very local
- *carbonana*, Dbld. Recorded by the older writers. Taken at *Lynn* by Mr. Atmore
- Antithesia salicella*, Linn. *Merton, Croxton, Glenchwarton, Hingham*
- Spilonota lariciana*, Z. *Norwich, Lynn*; local
- *aceriana*, Mann. *Norwich, Yarmouth, Denton, Lynn*; common
- *neglectana*, Dup. *Norwich, Denton*; local
- *rosæcolana*, Dbld. *Norwich, Cawston, Lynn*; in gardens feeding on rose-buds
- Sericoris bifasciana*, Haw. *Norwich, Merton, Thetford, Denton, Croxton, Lynn*; among *Scotch fir*
- *fuligana*, Haw. *Lynn*, larvæ found feeding on *Carduus arvensis*
- *doubledayana*, Bar. *Ranworth, Horning*; discovered in these fens, and sometimes found there in plenty; hardly known elsewhere
- *littorana*, Curt. Salt marshes on the coast beyond *Lynn*
- *cespitana*, Hb. *Yarmouth, Merton, Brandon, Swaffham*
- *conchana*, Hb. *Norwich, Surlingham, Merton, Ranworth*
- *micana*, Hb. *Merton, Croxton, Hingham, Horning, Ranworth, Lynn*; local
- Mixodia rubiginosana*, H.S. *Lynn, Thetford, Shouldham*; usually a *Scottish species*
- *palustrana*, Linn. Taken once near *Lynn* by Mr. Atmore
- *ratzeburghiana*, Sax. *Merton, Lynn*; among *fir*. Lord Walsingham finds the larva commonly on *Abies smithiana*
- Euchromia purpurana*, Haw. *Denton, Hunstanton*; scarce
- Orthotænia antiquana*, Hb. *Wormegay, Carbrooke, Mintlyn, Cawston*; not common
- *striana*, Sch. *Norwich, Yarmouth, Lynn*; not scarce
- *ericetana*, Bent. *Norwich, Merton, near Lynn*; not rare
- Eriopsela fractifasciana*, Haw. *Merton, Swaffham*; very local
- Phtheochroa rugosana*, Hb. *Norwich, Merton, Lynn*
- Cnephasia lepidana*, Curt. *St. Faiths, Merton, Lynn*; on heaths
- Sciaphila nubilana*, Hb. *Norwich, Merton, Denton, Lynn*; common
- *pascuana*, Hb. *Castle Rising, Lynn*; local
- *alternana*, Sch. *Norwich*; very local
- Sphaleroptera ictericana*, Haw. *Yarmouth, Denes*, common
- Clepsis rusticana*, Tr. *Merton, Horning, Ranworth, Lynn*; in fens and on boggy heaths
- Bactra furfurana*, Haw. Taken at *Walsoken* by Mr. A. Balding
- Phoxopteryx siculana*, Hb. *Cawston, Hingham, Ranworth, North Wootton*; in wet woods

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- Phoxopteryx unguicana, Linn. *Merton, St. Faiths*; scarce
 — biarcuana, Steph. *Merton, Ranworth, Lynn* district; local
 — inornatana, H.S. In the same places as the last, more frequent
 — uncana, Hb. Heaths near *Lynn*; local
 — paludana, Bar. *Ranworth, Horning*; only in the fens
 — derasana, Hb. *Merton, Lynn*; scarce
 — diminutana, Haw. *Merton, Ranworth, Wootton, Wormegay, Lynn, Denton*; very local
 — mitterbacheriana, Sch. *Merton, Cawston, St. Faiths*; not common
 Grapholitha nisana, Linn. *Merton, Wootton, Ranworth*; local, among willow
 — cinerana, Haw. *Merton, Lynn*; local, about poplars
 — nigromaculana, Haw. *Norwich, Merton, Cawston, Lynn*
 — minutana, Hub. *Yarmouth*; on poplar
 — obtusana, Haw. *Merton, Foxley*; common near *Lynn*
 Phlœodes immundana, Fisch. *Norwich, Merton, St. Faiths, Ranworth, Lynn, Wormegay*; among alder
 — demarniana, Fisch. *Wormegay*; common in some seasons near *Lynn*
 Poedisca bilunana, Haw. Widely distributed, among birch
 — oppressana, Tr. *Norwich, Ranworth, Lynn*; on poplars, very local
 — profundana, Sch. *Merton, Ketteringham, Rackheath, St. Faiths*
 — occultana, Dgl. *Norwich, Merton, Lynn*; among larch
 — ophthalmicana, Hb. *Lynn, Denton*; scarce
 — semifuscana, Haw. *Ranworth, Horning, Lynn*, in fens; very variable
 — sordidana, Hb. Generally distributed among alder
 Steganoptycha rufimitrana, H.S. Taken, and reared, from *Abies cephalonica*, at *Merton* by Lord Walsingham
 Halonota bimaculana, Don. *Merton, Cawston, Wootton, Lynn*
 — cirsiata, Z. Widely distributed
 — scutulana, Sch. *Norwich, Merton, Cawston, Lynn*; not very common
 — brunnichiana, Sch. *Croxton*; not common in this county
 — fœneana, Linn. *Norwich, Merton, Horning*; among mugwort
 — trigeminana, Steph. Common among ragwort
 — tetragonana, Steph. *Ketteringham, Stoke Ferry*; scarce
 — nigricostana, Haw. *Merton, Denton, Ringland, Lynn*
 Halonota ravulana, H.S. *Lynn*; rare
 — ehippana, Hb. *Merton, Ranworth, Wootton*; scarce
 Olindia ulmana, Hb. *Merton, Hingham, Brooke, Lynn*
 Semasia spiniana, Fisch. *Norwich, St. Faiths, Merton, Ranworth*; not scarce
 — janthinana, Dup. *Norwich, Lynn, Horning*; local
 — rufillana, Z. *Norwich, Merton*
 — wœberana, Sch. Generally distributed among fruit trees
 Coccyx strobilella, Linn. *Merton*; among spruce
 — splendidulana, Gn. *Merton, Lynn, Runc-ton*
 — pygmæana, Hb. *Merton, Lynn*, frequent; usually a great rarity
 — ochsenheimeriana, Z. *Merton, Denton, Lynn*
 — distinctana, Bent. *Merton*; common near *Lynn*
 — nigricana, H.S. *Merton, near Lynn*; not common; among *Pinus picea*
 — nanana, Tr. *Norwich, Merton, Lynn*; locally abundant
 Heusimene fimbriana, Steph. *Merton, Cawston, Wootton, Lynn*
 Retinia buoliana, Sch. Common in all fir woods
 — pinicolana, Dbld. *Merton, Cawston*
 — turionana, Linn. *Norwich, Merton, Croxton, Lynn*; with it at this last locality, its supposed variety, *posticana*, Zett., has been found by Mr. Atmore
 — pinivorana, Z. Common among Scotch fir
 Carpocapsa splendana, Hb. Widely distributed among oak trees
 — grossana, Haw. *Merton, Croxton, Swaffham, Lynn*
 — pomonella, Linn. Generally abundant in orchards
 Opadia funebrana, Tr. *Norwich*, rare; among plum
 Endopisa nebritana, Tr. Generally distributed in pea fields
 Stigmonota orobana, Tr. *Stoke Ferry*
 — coniferana, Rtz. *Norwich, Merton, Croxton, Shouldham*
 — perlepidana, Haw. *Merton, Cawston, Lynn*
 — nitidana, Fab. *Merton*; scarce; taken by Lord Walsingham
 — weirana, Dougl. Taken by the Rev. H. Williams at *Croxton*
 — erectana, Bar. The only known specimen of this species was taken among broom at *Merton* by the Hon. Mrs. Carpenter

INSECTS

- Stigmonota internana*, Gn. *Norwich, Merton, Lynn*; locally abundant
- *composana*, Fab. *Norwich, Merton, Ranworth*; among clover
- *regiana*, Z. *Norwich, Merton, Cawston, Lynn, Holt*; local
- *roseticolana*, Z. *Norwich, Merton, Swaffham, Lynn, Ringland, St. Faiths*; among wild rose
- Dicrorampha politana*, Sch. *Norwich, Seething, Merton, Cringleford, St. Faiths*; locally abundant
- *alpinana*, Tr. Taken near *Lynn* by Mr. Atmore
- *sequana*, Hb. *Norwich, Merton, Denton*; very local
- *saturana*, Gn. *Merton, Lynn*
- *plumbagana*, Tr. *Merton, Brandon*; locally abundant
- *simpliciana*, Haw. *Norwich, Merton, St. Faiths*; among mugwort
- *acuminatana*, Z. *Merton, Gayton*; local
- *consortana*, Steph. *Merton*; scarce
- Pyrodes rhediella*, Linn. *Norwich, Merton, Lynn*; common
- Catoptria albersana*, Hb. *Merton, Lynn*, scarce
- *juliana*, Curt. *Norwich, Merton, Cawston, Horning, Wootton*
- *microgrammana*, Gn. *Yarmouth Denes*; scarce
- *conterminana*, H.S. *Hingham*; scarce
- *fulvana*, Steph. *Norwich, Merton, Denton, Croxton, Brandon, Swaffham*; locally common
- *expallidana*, Haw. *Norwich, Yarmouth, Denton, Lynn*; rare
- *candidulana*, Nlk. *Lynn*, in salt marshes, among *Artemisia maritima*; excessively local
- *citrana*, Hb. *Norwich, Merton, Croxton, Brandon, Swaffham*; rather common in the 'Breck' district
- Trycheris mediana*, Sch. *Denton, Horning, Lynn*; very local
- Lobesia permixtana*, Hb. (reliquana, Stn.) *Merton, St. Faiths, Wormegay, Wootton*; not common
- Eupœcilia nana*, Haw. *Costessey, Horsford, Merton, Croxton, Lynn*; among birch
- *sodaliana*, Haw. (amandana, H.S.). Taken near *Swaffham* by Mr. Atmore
- + *dubitana*, Hb. *Croxton, Gaywood, Lynn Docks*, among *Crepis tectorum*
- *pallidana*, Z. *Yarmouth Denes, Middleton* near *Lynn*; scarce
- *atricapitana*, Steph. *Norwich, St. Faiths, Merton, Brandon, Wormegay, Lynn*; among ragwort
- *maculosana*, Haw. *Norwich*; scarce
- Eupœcilia hybridella*, Hb. *Hingham*; scarce
- *vectisana*, West. *Hunstanton*; common in salt marshes
- *affinitana*, Dougl. *Lynn, Hunstanton*; in salt marshes
- *udana*, Gn. *Merton, Horning, Ranworth*; in fens, scarce
- *manniana*, F.R. Once taken near *Lynn* by Mr. Atmore; a very rare species
- *geyeriana*, H.S. *Brundall, Ranworth, Lynn*; in fens and marshes among *Pedicularis palustris*
- *notulana*, Z. Also in fens, among *Mentha*, but not common
- *rupicola*, Curt. *Merton, Lynn*; among *Eupatorium cannabinum*
- *degreyana*, McL. *Norwich, Merton, Brandon, Croxton, Denton, Lynn*; discovered by Lord Walsingham in *Norfolk* and named in his honour; reared by him from *Plantago lanceolata*, and by Mr. Atmore from *Linaria vulgaris*
- *ciliella*, Hub. *Merton, St. Faiths Bogs*; in the latter locality is a remarkable local race of this species
- *erigerana*, Wlsm. *Norwich, Merton, Brandon, Croxton, Swaffham, near Lynn*; rather plentiful on the 'Breck-sand' among *Erigeron* acre. This species was long mistaken for *E. anthemidana*, Curt.
- Xanthosetia zoegana*, Linn. Generally distributed; its pretty var. *ferrugana* is taken occasionally
- *inopiana*, Haw. *Lynn district*; among *Inula dysenterica*
- Chrosis tesserana*, Sch. *Yarmouth, Merton, Brandon, Ringland*; very local
- Argyrolepis baumanniana*, Sch. *Hingham, Ketteringham*; scarce
- *subbaumanniana*, Wlk. *Norwich, Merton, Ashill, Croxton, Swaffham*; local, but sometimes common in old chalk-pits
- *badiana*, Hb. *Merton, Brandon, Lynn district, Denton*; scarce
- *cnicana*, Dbld. *Croxton, Wootton, Cawston, Ranworth*; among thistles
- Conchylis francillonana*, Fab. Taken near *Swaffham* by Mr. Atmore
- *smeathmanniana*, Fab. *Merton, Cawston*; scarce
- Aphelia pratana*, Hb. *Thetford, Horning*; local in this county
- Tortricodes hyemana*, Hb. *Merton, Croxton*; in oak woods
- Choreutis scintillulana*, Hb. *Norwich, Merton, Wormegay, Holme-next-the-Sea*; among *Scutellaria galericulata* in marshes

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- Xylopoa pariana*, Linn. *Denton, Cawston*; scarce
- Epigraphia steinkellneriana*, Sch. *Norwich, Lynn*; among blackthorn
- Xysmatodoma melanella*, Haw. (monilifera, Geoffr). *Merton*; very local, but not uncommon
- Ochsenheimeria birdella*, Curt. *Merton*
- *bisontella*, Linn. *Merton, Lynn*
- Scardia carpinetella*, Gn. *Merton, Brandon, Horning*; among fir
- *corticella*, Curt. *Lynn*, about a decaying oak
- *granella*, Linn. *Norwich, Merton, Wootton, Lynn*; in granaries, sometimes in multitudes about even the adjacent streets
- *uricolella*, Stn. In woods, frequent
- *arcella*, Fab. *Norwich, St. Faiths, Merton, Denton, Ranworth*
- Tinea imella*, Hb. *Brandon*, not rare; otherwise a very scarce insect
- *ferruginella*, Hb. *Norwich, Thetford, Brandon, Lynn*
- *misella*, Z. *Norwich, Merton, Wootton, Lynn*; in granaries
- *merdella*, Z. *Lynn*; in houses
- *pallescentella*, Stn. *Norwich, Lynn*; about houses
- *nigripunctella*, Haw. *Lynn*; rare
- *semifulvella*, Haw. *Norwich, Merton, Denton, Swaffham, Lynn*
- *bistrigella*, Haw. *Merton, Lynn district, Beccles*
- Lampronia quadripuncta*, Fab. *Norwich, Wormegay*; scarce
- *luzella*, Hb. *Merton*; not common
- *prælatella*, Sch. *Merton, Brooke, Ranworth*
- *rubiella*, Bjer. *Merton, Ranworth*; common near *Lynn*
- Incurvaria pectinea*, Haw. *Lynn*
- *cœhlmanniella*, Hb. *Lynn, Wormegay*; local
- *capitella*, Linn. *Lynn*; among currant
- Nemophora metaxella*, Hb. *Norwich, Merton, Ranworth, Lynn*
- Adela rufimitrella*, Scop. *Wormegay*
- *cuprella*, Fab. *Lynn, Horning*; not rare
- Nemotois scabiosellus*, Scop. *Norwich*, common at *Merton*
- *cupriacellus*, Hb. *Swaffham*, taken by Mr. Atmore
- *minimellus*, Z. *Merton, Ranworth*
- Swammerdamia oxyacanthella*, Z. *Lynn*; locally abundant
- Scythropia cratægella*, Linn. *Lynn*; scarce
- Hyponomeuta vigintipunctatus*, Rtz. *Hickling Fen, Carbrooke*
- Hyponomeuta plumbella*, Sch. *Norwich, Surlingham, Merton*
- *evonymella*, Linn. *Sprowston, Merton*; among *Prunus padus*
- Anesychia funerella*, Fab. *Brandon Fen*; one at *Lynn*, at 'light'
- Plutella porrectella*, Linn. *Merton, Lynn*; among *Hesperis matronalis*
- Cerostoma sequella*, Linn. *Merton, Denton, Carbrooke*
- *vittella*, Linn. Generally distributed among elm
- *costella*, Fab. *Merton*
- *sylvella*, Linn. *Norwich, St. Faiths, Merton, Hingham, Carbrooke*
- *alpella*, Sch. *Merton*; among oak
- *lucella*, Fab. *Denton*; taken by the Rev. C. T. Cruttwell
- Harpieryx scabrella*, Linn. *Norwich, St. Faiths, Merton*
- *horridella*, Tr. *Merton*; taken by Lord Walsingham
- *nemorella*, Linn. *Merton, Lynn*
- Pteroxia caudella*, Linn. *Norwich*; among *Euonymus europæus*
- Orthotælia sparganiella*, Th. Common in fens and marshes among *Sparganium*
- Enicostoma lobella*, Sch. *Norwich, Merton, Denton, Lynn, Gayton*
- Exerætia allisella*, Stn. Taken at *Lynn* by Mr. Atmore, recorded from the 'coast of Norfolk' by the late Mr. Stainton
- Depressaria scopariella*, Sch. *Norwich, Yarmouth, Merton, Brandon*
- *rhodochrella* (?) H.S. *Norwich, Yarmouth*; scarce
- *vaccinella*, Hb. *Norwich, Merton, Denton, Ranworth*
- *hypericella*, Hb. *Merton, Denton*; among *Hypericum*
- *conterminella*, Z. Common in the fens
- *yeatiana*, Fab. Common in the fens
- *ciliella*, Stn. *Merton, Denton, Ranworth*
- *granulosella*, Stn. *Norwich, Merton, Denton, Brandon*; very local
- *albipunctella*, Hb. *Norwich, Merton, Denton*
- *pulcherrimella*, Stn. *Norwich*; among *Bunium flexuosum*; taken by Lord Walsingham commonly at *Merton*
- *weirella*, Stn. *Norwich, Merton, Brandon*
- *chærophylli*, Z. *Norwich, Merton, Denton*
- *badiella*, Hb. *Norwich, Yarmouth, Cromer*
- *nervosa*, Haw. Taken at *Hoveton* by Mr. Norgate
- Psoricoptera gibbosella*, Z. *Lynn*; scarce. Formerly at *Merton*

INSECTS

- Gelechia nigra*, Haw. *Croxton, Lynn* ; scarce
 — *muscosella*, Z. *Ranworth* ; rare
 — *rhombella*, Hb. *Norwich* ; among crab-apple ; scarce
 — *distinctella*, Z. *Norwich, Merton, Yarmouth, Brandon, Lynn* ; locally common
 — *sororculella*, Hb. *Merton, Ranworth* ; among swallow
Brachmia mouffetella, Sch. *Merton* ; among honeysuckle
 — *lathyri*, Stn. *Merton, Irstead, Wormegay, Lynn* ; in fens
Bryotropha politella, Dgl. *Lynn*, rather common ; *Merton*
 — *desertella*, Stn. Most abundant on the 'Breck-sands,' as well as on the present coast
 — *senectella*, Z. *Norwich, Merton, Lynn, Hunstanton* ; abundant
 — *mundella*, Dgl. *Yarmouth*, on the sands
 — *similis*, Dgl. Near *Lynn, Merton*
 — *umbrosella*, Z. *Yarmouth, Lynn* heaths ; abundant
 — *tetragonella*, H.S. *Hunstanton* ; excessively local
Lita artemisiella, Tr. *Merton, Swaffham*, among thyme
 — *atriplicella*, Fisch. Near *Hunstanton*, on the coast
 — *instabilella*, Dgl. *Hunstanton, Thornham*
 — *obsoletella*, Fisch. In salt marshes on the coast
 — *suedella*, Rich. *Hunstanton, Heacham* ; common among *Sueda fruticosa* ; a newly-described species—hardly found elsewhere
 — *plantaginella*, Stn. On the coast ; common among *Plantago coronopus*
 — *acuminatella*, Stn. *Norwich, Merton* ; not common
 — *hübneri*, Haw. *Croxton* ; rare
 — *maculiferella*, Mann. *Norwich, Merton, Lynn* ; local
 — *semidecandriella*, Th. *Merton, Croxton, Thetford, Lynn*
 — *vicinella*, Dgl. *Hunstanton, Heacham* ; rare
Teleia scriptella, Hb. *Lynn, Hingham, Denton, Merton* ; among maple
 — *sequax*, Haw. *Denton*
 — *fugitivella*, Z. *Norwich, Merton, Lynn, Denton* ; on elm
 — *humeralis*, Z. *Merton* ; taken by Lord Walsingham
 — *notatella*, Hb. *Norwich, Merton, Ranworth* ; not common
 — *luculella*, Hb. *Merton, Lynn*
 — *dodecella*, Linn. Not uncommon among fir
Recurvaria leucatella, Linn. *Norwich* ; scarce
Pœcilia albiceps, Z. *Lynn, Merton*
 — *gemmella*, Linn. *Norwich, St. Faiths, Lynn, Denton*
Argyritis pictella, Z. *Yarmouth, Hunstanton, Merton, Croxton, Brandon* ; on the 'Breck-sand' even more commonly than upon the present coast. With it Lord Walsingham has taken the form hitherto supposed to be a distinct species, under the name of *tarquiniella*, Stn.
Nannodia næviferella, Z. *Norwich, Merton, Lynn*, among *Chenopodium*
 — *hermannella*, Fab. *Wootton* ; very local
Apodia bifractella, Mann. *Lynn* ; very local
Sitotroga cerealella, Oliv. *Norwich*, rare ; abundant about grain warehouses at *Lynn*
Ptocheuusa subocellea, Steph. *Merton*, scarce
 — *inopella*, Z. *Lynn* ; among *Inula dysenterica*
 — *osseella*, Stn. *Norwich* ; rare
Ergatis subdecurtella, Stn. *Ranworth* ; among *Lythrum salicaria* ; rare
 — *ericinella*, Z. Near *Norwich, St. Faiths, Merton, Lynn* ; on heaths
Xystophora palustrella, Dgl. *Ranworth, Horning, near Beccles* ; in fens, rare
 — *arundinetella*, Z. *Merton* ; rare
 — *lucidella*, Stph. *Merton*, abundant ; *Lynn*, very local
 — *suffusella*, Dgl. *Ranworth* ; rare
 — *morosa*, Z. *Ranworth, Lynn* ; scarce
 — *servella*, Z. Taken by Mr. Atmore, near *Lynn* ; recognized and recorded by Lord Walsingham. I know of no other locality for this species in the British Isles
Monochroa tenebrella, Hb. *Norwich, St. Faiths, Brandon, Merton, Denton, Lynn*. *M. tenebrosella* is now recognized as its female
Lamprotes atrella, Haw. *Merton, Ranworth, Surlingham, Denton, Lynn*
 — *unicolorella*, H.S. *Lynn* ; on heaths
Aproaerema ligulella, Z. In the fens among *Lotus major*
 — *tæniolella*, Tr. *Cringleford, Croxton, Denton, Lynn, Hunstanton*
 — *albipalpella*, H.S. *Lynn* ; on heaths
Acanthophila alacella, Dup. Several taken at *Merton* by Lord Walsingham, and one at *Lynn* by Mr. Atmore
Ceratophora rufescens, Haw. Frequent in the fens, also found at *Merton* on dry sandy ground
Cladodes gerronella, Z. Not scarce in the fens

A HISTORY OF NORFOLK

- Parasia metzneriella*, Dgl. *Merton, Lynn* ; local
- Cleodora cytisella*, Curt. *Merton, Easton* ; more common near *Lynn*
- Chelaria conscriptella*, Hb. *Merton, Denton, Lynn*
- Anarsia spartiella*, Schr. Widely distributed among furze
- Nothris verbascella*, Sch. *Norwich* ; among *Verbascum pulverulentum* ; hardly known elsewhere in the United Kingdom
- Ypsolophus schmidiellus*, Heyd (*durdhamella*, Stn.). Near *Swaffham*, among *Origanum*
- *marginellus*, Fab. *Merton, Stanford* ; locally very common
- Sophronia parenthesella*, Linn. *Norwich, Merton, Cringleford, Lynn* ; locally abundant
- Harpella geoffrella*, Linn. *Norwich, Denton, Hingham* ; common
- Pleurota bicostella*, Linn. *Merton, Lynn* ; abundant on heaths
- Cataplectica fulviguttella*, Z. (*flavimaculella*, Stn.). *Merton, Ranworth* ; among *Angelica*
- Cecophora minutella*, Linn. *Norwich, Merton*
- *tresignella*, Z. *Norwich, Denton, Lynn*
- *lambdella*, Don. *Merton* ; one specimen taken by Mr. Durrant
- *lunaris*, Haw. *Norwich, Cringleford, Denton, Merton*
- *tinctella*, Tr. *Norwich, Merton, Denton, Lynn*
- *unitella*, Hb. *Merton*
- *flavifontella*, Hb. *Norwich* ; very local
- Butalis grandipennis*, Haw. *Norwich, Horing* ; among furze
- *fusco-ænea*, Haw. *Lynn* ; taken by Mr. Atmore
- *fusco-cuprea*, Haw. *Swaffham*
- Amphisbatis incongruella*, Stn. *Horsford*, near *Lynn* ; scarce
- Pancalia leuwenhoeckella*, Linn. *Merton* ; scarce
- Acrolepia autumnitella*, Curt. *Merton, Denton, Ranworth*
- Glyphipteryx oculatella*, Z. *Denton*
- *equitella*, Sc. *Norwich, Brandon* ; among *Sedum acre*
- *schœnicolella*, Stn. *Merton, Ranworth, Barton Turf* ; common in the fens ; its only other locality in this country seems to be in *Cornwall*
- Æchmia dentella*, Stn. *Norwich, Easton, Merton, Denton, Lynn* ; local
- Perittia obscuripunctella*, Stn. *Merton, Denton, Lynn*
- Tinagma sericeella*, Haw. Widely distributed among oak
- *hammomiella*, Sorh. Taken among birch near *Lynn* by Mr. Atmore, and the mines found at *Merton* by Lord Walsingham
- *resplendella*, Dgl. *Merton, Ranworth, Lynn, Wormegay*
- Douglasia ocnerostomella*, Stn. *Merton, Brandon, Thetford* ; among *Echium vulgare*, in the pith of which the larva feeds
- Argyresthia ephippella*, Fab. *Merton, Denton, Lynn* ; local
- *conjugella*, Z. *Costessey, St. Faiths, Merton* ; among mountain ash
- *semifusca*, Haw. *Norwich, St. Faiths, Denton* ; among hawthorn
- *spiniella*, Z. *Lynn, Wootton, Merton*
- *glaucinella*, Z. *Merton, Ringland* ; among oak
- *atmoriella*, Bks. *Lynn* ; discovered by Mr. Atmore ; *Merton*, larvæ found in the shoots of *Pinus larix*
- *dilectella*, Z. *Merton, Wootton* ; among juniper
- *curvella*, Linn. *Norwich, Merton, Denton, Lynn* ; among apple
- *arceuthina*, Z. *Norwich, Denton* ; very abundant at *Merton* among juniper
- *præcocella*, Z. *Merton* ; taken by Lord Walsingham
- Cedestis gysselinella*, Kuhl. *Merton, Croxton* ; usually a northern insect, but abundant at *Merton*
- Zelleria insignipennella*, Stn. *Merton* ; local
- Gracilaria hemidactylella*, Hb. *Merton*
- *phasianipennella*, Hb. *Lynn* ; scarce
- *semifascia*, Haw. *Denton*
- *omissella*, Dgl. *Norwich* ; among *Artemisia vulgaris*
- *auroguttella* Steph. *Merton, Ranworth* ; among *Hypericum quadrangulum*
- Coriscium brongniardellum*, Fab. *Norwich, Merton*
- *cuculipennellum*, Hb. *Merton* ; among privet
- *citrinellum*, Fisch. *Merton, Sandringham*
- Ornix betulæ*, Stn. *Norwich, Merton, Denton, Lynn* ; among birch
- *torquillella*, Stn. *Norwich, Denton, Merton* ; among sloe
- *scoticella*, Stn. Near *Lynn*, taken by Mr. Atmore ; reared at *Merton*
- *guttea*, Haw. *Norwich, Merton, Lynn, Gayton* ; among apple
- Coleophora spissicornis*, Haw. ; (*fabriciella*, Stn.) *North Runcton, Merton, Denton*
- *deauratella*, Z. Taken at *Merton* by Mr. J. Hartley Durrant
- *lixella*, Z. *Merton, Swaffham*

INSECTS

- Coleophora tricolor*, Wlsm. *Merton*, 1899; taken by Lord Walsingham; not yet detected elsewhere
- *paripennella*, Fisch. *Lynn* } These four
 — *potentillæ*, Bankes. *Lynn* } taken by
 — *wilkinsoni*, Stn. *Lynn* } Mr. Atmore
 — *pyrrhulipennella*, Z. *Lynn*
 — *ibipennella*, Heyd. *Merton*, *Ranworth*
 — *currucipennella*, Fisch. *Ranworth*, *Denton*; rare
- *niveicostella*, Fisch. *Merton*
 — *genistæ*, Stn. *Merton*, *St. Faiths*, *Lynn*; among *Genista anglica*
- *leucapennella*, Hb. The only known British specimen of this rather distinct species was taken by the Rev. C. T. Cruttwell, near *Denton*, in 1890
- *saturatella*, Stn. *Merton*
 — *inflata*, Stn. *Merton*, *Croxton*, *Brandon*; among *Silene inflata*
- *graminicolella*, Heine. *Lynn*, *Ranworth*; rare
- *siccifolia*, Stn. Taken at *Merton* by Lord Walsingham
- *glaucicolella*, Wood. *Lynn*; among *Juncus*
- *alticolella*, Z. *Hunstanton*, *Merton*; among *Juncus lamprocarpus*
- *murinipennella*, Dup. *Merton*, *Norwich*
 — *mæniacella*, Fab. In salt marshes on the coast near *Lynn*
- *salinella*, Stn. (?) *Hunstanton*; among *Salsola kali*
- *tripoliella*, Hm. Most abundant in salt marshes at *Lynn*
- *artemisiella*, Scott. *Norwich*; scarce
- *juncicolella*, Stn. *St. Faiths*, *Lynn*; on heaths
- *gryphipennella*, Bouché. *Merton*, *Denton*, *Lynn*; among rose
- *olivaceella*, Stn. *Merton*; taken by Mr. Durrant
- *chalcogrammella*, Z. *Merton* formerly; *Brandon*, *Croxton*, near *Lynn*
- Stathmopoda pedella*, Linn. *Lynn*; local
- Cosmopteryx orichalcea*, Stn. *Merton*, *Ranworth*, *Barton Turf*, *Lynn*.
- *druryella*, Z. *Lynn*; taken by Mr. Atmore
- *lienigiella*, Z. *Ranworth*, *Horning*, *Wormegay*; among reed and reed-grass
- Batrachedra pinicolella*, Z. *Norwich*, *St. Faiths*, *Merton*, *Brandon*, *Wootton*; among Scotch fir
- Oinophila v-flava*, Haw. *Norwich*, *Merton*; in cellars
- Chaulioidus illigerellus*, Hb. *Merton*, *Ranworth*, *Brundall*, *Lynn*; in fens
- *chærophyllellus*, Goed. *Norwich*, *Merton*; scarce
- Laverna propinquella*, Stn. *Norwich*, *Surlingham*; in fens
- *lacteella*, Stn. *Denton*
 — *miscella*, Sch. *Ringstead*
 — *ochraceella*, Curt. *Merton*, *Denton*
 — *phragmitella*, Bent. *Brundall*, *Merton*, *Ranworth*, *Horning*; always about *Typha latifolia*
- *epilobiella*, Roem. (*langiella*, Hb.). *Denton*; scarce
- *decorella*, Steph. *Merton*, *Denton*
 — *subbistrigella*, Haw. *Merton*, *Denton*
 — *vinolentella*, H.S. *Norwich*, *Lynn*; among apple and Siberian crab
- *ramniella*, Z. *Ranworth*, *Merton*, *Lynn*
- Chrysoclista schrankella*, Hb. *Merton*; taken by Lord Walsingham
- Asychna æratella*, Z. *Swaffham*; rare
- Antispila pfeifferella*, Fab. *Merton*; among *Cornus sanguinea*
- Stephensia brunnichella*, Linn. *Norwich*; among *Clinopodium vulgare*
- Elachista gleichenella*, Fab. *Merton*, *Denton*, *Ranworth*
- *magnificella*, Tengs. *Merton*; a beautiful buff variety of this handsome little species has also been taken here by Mr. Durrant
- *apicipunctella*, Stn. *Wormegay*, *Denton*, *Bawsey*; scarce
- *poæ*, Dgl. *Merton*; among *Poa aquatica*
- *bedellella*, Sirc. Taken at *Ringstead* by Mr. Atmore
- *kilmunella*, Stn. *Norwich*, *St. Faiths*, *Ranworth*, *Merton*; in fens
- *cinereopunctella*, Stn. *Merton*
 — *subnigrella*, Dgl. *Merton*, *Denton*
 — *cerussella*, Hb. Common in the fens
- *paludum*, Frey. *Surlingham*, *Ranworth*, *Denton*, *Lynn*; among *Carex*
- *megerlella*, Z. *Denton*
 — *triatomea*, Haw. *Norwich*, *Plumstead*, *Merton*; in chalk-pits
- *ochreella*, Stn. *Wormegay*, *Lynn*; in marshes
- Lithocolletis hortella*, Fab. *Merton*, *Denton*, *Middleton*
- *quinqueguttella*, Stn. *Merton*, *Ranworth*; among dwarf willow
- *lautella*, Z. *Norwich*, *Horstead*, *Merton*; the pretty var. *irradiella* has also been found by Lord Walsingham at *Merton*
- *carpinicolella*, Stn. *Merton*, *Horstead*; among hornbeam
- *sorbi*, Frey. *Denton*; probably widely distributed.
- *oxyacanthæ*, Frey. *Merton*
 — *concomitella*, Bankes. *Merton*
 — *spinolella*, Dup. *Merton*, *Denton*
 — *viminetorum*, Stn. *Lynn*

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- Lithocolletis scopariella*, Fisch. *Merton*, *St. Faiths*, *Lynn*
 — *ulicicolella*, Vaugh. *Lynn*; abundant at *Norwich* among furze
 — *heegeriella*, Z. *Merton*, *Denton*
 — *sylvella*, Haw. *Norwich*, *Merton*, *Denton*; among maple
 — *emberizæpennella*, Bou. *Wormegay*, *Mintlyn*, *Denton*; among honeysuckle
 — *frolichiella*, Z. *Merton*, *Lynn*; common among alder
 — *kleemannella*, Fab. *Lynn*; taken by Mr. Atmore
 — *stettinensis*, Nic. *Merton*, *Ranworth*, *Lynn*; among alder
 — *schreberella*, Fab. *Norwich*, *Merton*, *Denton*; among elm
 — *tristrigella*, Haw. *Merton*, *Lynn*; among elm
Lyonetia clerckella, Linn. *Norwich*, *Merton*, *Denton*, *St. Faiths*; not scarce
Phyllocnistis suffusella, Z. *Norwich*, *Merton*, *Lynn*; among poplar
 — *saligna*, Z. *Merton*; among willow
Cemiosoma spartifoliella, Hb. Among broom;
C. laburnella, Heyd., among laburnum;
C. scitella, Z., among hawthorn; all generally distributed
 — *lotella*, Stn. *Merton*; among *Lotus major*
Opostega salaciella, Tr. *Norwich*, *Brandon*, scarce; abundant at *Roydon*, near *Lynn*, and at *Merton*. Its probable variety, *reliquella*, found with it at *Merton* by Lord Walsingham
 — *auritella*, Hb. *Ranworth Fen*; rare
 — *crepusculella*, Fisch. Common in all the fens; also in marshes
Bucculatrix aurimaculella, Stn. *Norwich*, *Lynn*, *Merton*; common among ox-eye daisy
 — *cidarella*, Fisch.; *B. ulmella*, Mann.; *B. cratægi*, Dup.; all three generally distributed; among alder, oak and hawthorn respectively
 — *maritima*, Stn. In the salt marshes of the coast among *Aster tripolium*
 — *demaryella*, Dup. Near *Lynn*; among birch
 — *boyerella*, Dup. *Norwich*, *Lynn*, *Denton*; among elm
 — *frangulella*, Gn. *Ranworth Fen*, and marshy heaths near *Lynn*; among *Rhamnus frangula*
Bucculatrix cristatella, Fisch. *Norwich*, *Merton*; among yarrow
Nepticula atricapitella, Haw.; *N. ruficapitella*, Haw.; *N. pygmaella*, Haw.; all near *Norwich* and *Merton*, among oak and hawthorn
 — *septembrella*, Stn. Among *Hypericum*; *N. oxyacanthella*, Stn.; *N. alnetella*, Stn., among alder; *N. basalella*, H.S.; *N. turicella*, H.S.; *N. confusella*, Wlsm.; *N. fletcheri*, Tt.; and *N. acetosæ*, Stn.; all found at *Merton* by Lord Walsingham and Mr. Durrant
 — *cryptella*, Frey.; *N. gratiosella*, Stn.; *N. plagicolella*, Stn.; *N. prunetorum*, Stn.; *N. continuella*, Stn.; *N. lapponica*, Wk.; *N. sorbiella*, Stn.; *N. aucupariæ*, Stn.; *N. desperatella*, Frey.; *N. ulmivora*, Stn.; and *N. sertella*, Stn.; all taken in the *Lynn* district by Mr. Atmore
 — *catharticeila*, Stn. Taken at *Croxton* by the Rev. H. Williams, and at *Merton* by Mr. Durrant
 — *trimaculella*, Haw. *Denton*; among poplar
 — *microtheriella*, Stn. *Horstead*; among hazel
 — *ignobilella* Stn.; *N. malella*, Stn.; and *N. atricollis*, Stn.; all found near *Norwich*
Trifurcula pulverosella, Stn. *Norwich*; among wild apple
Bohemannia quadrimaculella, Boh. *Ranworth*, and near *Lynn*; not rare
Eriocephala calthella, Linn. *Merton*
 — *aruncella*, Scop. *Brooke* woods; not scarce
 — *seppella*, Fab. *Norwich*, *Merton*; on *Veronica chamædrys*
 — *mansuetella*, Z. *Merton*, common; *Ranworth*, scarce
 — *thunbergella*, Steph. *Merton*
Micropteryx purpurella, Steph.; *M. semipurpurella*, Steph.; *M. unimaculella*, Z.; all abundant among birch at *Merton* and near *Lynn*
 — *sangii*, Stn. Found by Mr. Atmore near *Lynn*
 — *sparmannella*, Bosc. *Merton*, among birch; also not uncommonly near *Lynn*

HEMIPTERA

The order Hemiptera or Bugs consists of insects of small or medium size which are for the most part readily recognizable by the possession of

INSECTS

a more or less long and pointed beak. The latter is carried on the under side of the fore part of the body and in some species reaches as far as the base of the hind legs. The order is divided by systematists into two main sections: the Heteroptera, in which the front of the head is quite free from the base of the forelegs, and the Homoptera, in which that part which should be the front of the head is closely applied to the base of the forelegs so that the beak appears to rise from the middle of the breast. The Heteroptera, which may be termed 'running-bugs,' in contradistinction to the Cicadina and Psyllina, which are essentially 'jumping-bugs,' comprises a number of species exhibiting considerable diversity of form and habits. Few, if any, of them are likely to attract the notice of the casual observer, though the habits of many species are very interesting. The female of *Acanthosoma interstinctum*, a species common on birch trees in the autumn, has been observed to take charge of its eggs and young in a fashion very unusual among insects. The Rev. John Hellins observed that the female *Acanthosoma* laid her eggs on the underside of a birch leaf, in number between thirty and forty; they were laid close together, the outer on their side and the inner ones stood up on end in a somewhat diamond-shaped patch, about the size of the body of the parent insect. The latter then stood brooding over the patch of eggs, and after about three weeks the young bugs were found clustered beneath their mother amongst the empty egg-shells. At first the mother showed no fear and barely moved when touched, only altering her position so as to protect the side on which the danger threatened. In a few days, however, when the young ones had accomplished their first moult and commenced to run about on the leaf, she moved about amongst them in a state of apparent anxiety, and fluttered her wings rapidly if they were disturbed. If the sun shone out and the leaf was still there was a great deal of running to and fro, but at night and when the wind blew roughly, the mother contrived to get the young ones under her, and sat covering them as at first. This state of things continued for about a couple of days, when the young dispersed in small parties, but even at this point the mother seemed desirous to continue her ministrations. A few species associate with ants to which they bear considerable resemblance, especially when in motion; *Systellonotus triguttatus* furnishes a good example of these. This species is found not uncommonly on the celebrated Mousehold Heath running on the ground in company with a blackish ant; its male is a bug-like insect about three-sixteenths of an inch long, with reddish brown upper wings traversed by two broad snow-white bands, whilst the female has the merest rudiments of wings, and the body is pinched in at the waist and widened behind so as to give the creature a very ant-like appearance. Passing over the water-boatmen (*Notonecta*), which are too well-known to call for remark, we have in *Ranatra linearis* a very curious and interesting form. This is a narrow pale-brown insect with a body about $1\frac{1}{4}$ inch long, and two thread-like tails almost as long as the body, and which when brought together form a tube along which air passes to the breathing organs situate at the tip

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of the body ; its antennæ are very short and inconspicuous, but its mode of carrying its forelegs is such that the latter have much the appearance of antennæ. It may be dredged from the bottom of the water at Hickling Broad and elsewhere, but it is by no means easy to see when mixed up in the water-net with broken and decayed pieces of sedge and other rubbish, as it is very deliberate in its movements.

The Homoptera are divided into three sections. The Trimera, the first of these, has three joints to the feet, and comprises the various families of jumping-bugs proper (*Cicadina*). The members of the second section, the Dimera, have but two joints to the feet : this section contains the *Psyllidæ*, small insects having somewhat the facies of a Cicada in miniature ; the plant-lice (*Aphidæ*) ; and the *Aleurodidæ*. The latter are very minute insects with four milk-white wings, and are excessively abundant on cabbage. The third section, the Monomera, in which the feet are formed of a single joint, contains only the scale-insects (*Coccidæ*). The Cicadina are particularly well represented in Norfolk, the proportion occurring in the county being 78 per cent. of the number known to occur in the British Islands. These insects are for the most part small, and with the exception of the cuckoo-spit frog hopper (*Philænus spumarius*), and some of the yellow species of *Typhlocyba*, small, delicate, cylindrical insects which frequently get blown on to one's clothing from trees and fences in the fall of the year, none of them are very likely to be seen unless searched for. The patches of froth in which the nymph of *P. spumarius* lives are conspicuous objects on various low plants, and the perfect insects are remarkable for the variety of colour patterns which they exhibit ; some of these varieties show simply variation in degree, but others, such as the entirely black and the entirely pale forms, those black with a pale head, black with a pale border to the upper wings, etc., are perfectly distinct in appearance and might well be considered by a non-entomological observer to belong to different species. *Tettigonia viridis* is a strikingly beautiful insect which occurs in profusion amongst low plants growing in damp places ; the male is about one-third of an inch long, and has the upper wings of a rich deep blue ; the female is a little larger and of a delicate pale green colour closely resembling that of the lower part of the stems of the grasses and rushes amongst which the insect lives. The capture of jumping-bugs uninjured for the collection is really quite a sporting business, the chances of escape being at least ten to one in favour of the insect ; this is more especially the case with those species which live near the roots of herbage in marshes and by the sides of ditches, as these tiny animals have a provoking habit, even when they do not at first jump quite away, of retiring to the opposite side of the stem on which they are perched on the approach of the would-be captor's hand ; and of the species that can be got into the sweeping or beating-net only a comparatively small portion find their way into the collector's killing bottle, owing to the extreme activity of his temporary captives.

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In the following list the names of the captors or recorders of species when other than the author are given after each entry. No particulars are appended to species generally distributed or of frequent occurrence in the county. The entomologists referred to in this list are : the late W. G. Blatch, F.E.S. (1840-1900) ; the late J. A. Brewer of Reigate ; the late J. B. Bridgman, F.L.S., F.E.S., of Norwich (1837-99) ; the Rev. J. Landy Brown of Norwich ; E. A. Butler, F.E.S. ; G. C. Champion, F.Z.S., F.E.S. ; John Curtis (*British Entomology*, 1838) ; the late T. P. Dossetor who lived in Norwich, 1876-87 ; the Rev. Canon Fowler of Lincoln ; Frank Norgate formerly of Sparham ; C. J. and J. Paget (*Sketch of the Natural History of Great Yarmouth and its Neighbourhood*, 1834) ; the late Dr. J. A. Power of London (1810-86) ; Edward Saunders, F.L.S. (*Hemiptera Heteroptera of the British Islands*, 1892) ; the Rev. T. Skrimshire of Syderstone (circ. 1825) ; H. J. Thouless of Norwich ; J. J. Walker, R.N., F.E.S.

HETEROPTERA

SCUTELLERIDÆ

Corimelæna scarabæoides, Linn. *Eaton*, near *Norwich*, April, 1874 ; *Howe Grove*, July, 1888, *Thouless* ; *Norwich*, *Dossetor*

Odontoscelis fuliginosa, Linn. *Sand-hills*, *Burnham*, *Skrimshire*

Podops inuncta, Fab. *Eaton*, July, 1874 ; *Mousehold Heath*, *Thouless*

CYDNIDÆ

Sehirus bicolor, Linn.

Gnathoconus albomarginatus, Fab. *Arm-ingham*

— *picipes*, Fall. *Yarmouth*, *Norwich*

PENTATOMIDÆ

Ælia acuminata, Linn. *Caister Marrams*, *Curtis*

Neottiglossa inflexa, Wolff. *Howe Grove*, *Thouless*

Pentatoma baccarum, Linn. *Foxley Wood*, *Norgate* ; *Drayton Drewray*, *Thouless*

— *prasina*, Linn. *Yarmouth* ; 'on firs, very common,' *Paget*

Strachia festiva, Linn. *Norwich*, *Saunders*

Piezodorus lituratus, Fab.

Tropicoris rufipes, Linn.

ASOPIDÆ

Picromerus bidens, Linn.

Asopus punctatus, Linn. *Mousehold Heath*

Podisus luridus, Fab. *Sparham*, *Norgate* ; *Drayton Drewray*, *Thouless*

Zicrona coerulea, Linn. *Coxford*, August 10th, 1887 ; one example

ACANTHOSOMIDÆ

Acanthosoma hæmorrhoidale, Linn.

— *dentatum*, De G.

— *interstinctum*, Linn.

COREIDÆ

Pseudophlæus falleni, Schill. *Brandon*, *Walker*

Bathysolen nubilus, Fall. *Sparham district*, *Norgate* ; *Norwich*

Coreus denticulatus, Scop. *Mousehold Heath*, *Dossetor*

ALYDIDÆ

Alydus calcaratus, Linn. *Mousehold Heath*, *Dunston Common* ; *Southbrepps*, *Butler*

CORIZIDÆ

Therapha hyoscyami, Linn. *Caister Marrams*, *Paget*

Corizus parumpunctatus, Schill. *Drayton Drewray*, September 5th, 1884 ; one example

Myrmus myriformis, Fall.

Chorosoma schillingi, Schml. *Caister Marrams*, *Paget*

BERYTIDÆ

Neides tipularius, Linn. *Hunstanton*, July 30th, 1885 ; one example

Berytus clavipes, Fab. *Norfolk*, *Curtis*

— *minor*, H.S. } *Mousehold Heath*

— *signoreti*, Fieb. }

— *montivagus*, Fieb. *Thetford* ; *Mousehold Heath*, *Thouless*

METACANTHIDÆ

Metacanthus punctipes, Germ. *Yarmouth*, *Thouless* ; *Gimingham*, *Butler*

LYGÆIDÆ

Nysius thymi, Wolff.

CYRIDÆ

Cymus glandicolor, Hahn.

— *melanocephalus*, Fieb.

— *clavicularis*, Fall.

Ischnorhynchus resedæ, Panz. *Stratton Strawless*, *Ringland*

— *geminatus*, Fieb.

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ARTHENEIDÆ

Chilacis typhæ, Perr. *Swanton Morley*

HETEROGASTRIDÆ

Heterogaster urticæ, Fab. *Lynn, Bridgman; Holkham*

PACHYMERIDÆ

Plociomerus fracticollis, Schill. *Horning, etc.*

Rhyparochromus prætextatus, H.S. *Mousehold Heath, Thetford Warren, Curtis; Earlham*

— *dilatatus*, H.S. *Mousehold Heath, Dossetor*

— *chiragra*, Fab.

— *sabulicola*, Thoms. *Yarmouth, Thouless*

Ischnocoris angustulus, Boh.

Macrodera micropterum, Curt.

Plinthinus brevipennis, Latr.

Acompus rufipes, Wolff. *Eaton, Horning; Thouless found a macropterous example at the latter place*

Stygnus rusticus, Fall. A macropterous example, *Stoke Holy Cross*, September, 1884, *Thouless; Gimingham, Butler*

— *pedestris*, Fall.

— *arenarius*, Hahn.

Peritrechus geniculatus, Hahn. *Mousehold Heath, Yarmouth*

— *nubilus*, Fall. *Foxley Wood, Thouless*

— *luniger*, Schill.

Trapezonotus agrestis, Panz. *Mousehold Heath*

Aphanus pedestris, Panz. Common under bark throughout the *Norwich district*

— *lynceus*, Fab. *Hunstanton, Fowler*

— *pini*, Linn. *Mousehold Heath*

Eremocoris fenestratus, H.S. *Hunstanton, Blatch*

Drymus sylvaticus, Fab.

— *brunneus*, Sahl.

Notochilus contractus, H.S. *Ringland*

Scolopostethus pictus, Schill. *Horning, Brewer*

— *puberulus*, Horv. *Horning*

— *affinis*, Schill.

— *neglectus*, Edw.

— *decoratus*, Hahn.

Gastrodes abietis, Linn. In cones of spruce fir, *Merton Park, Lord Walsingham*

— *ferrugineus*, Linn.

PIESMIDÆ

Piesma quadrata, Fieb.

— *capitata*, Wolff.

TINGIDIDÆ

Serenthia læta, Fall. *Dunston Common, Weybourne*

Orthostira cervina, Germ. *Swanton Morley*

TINGIDIDÆ (continued)

Orthostira parvula, Fall.

Dictyonota crassicornis, Fall. *Hellesdon, Mousehold Heath, Cley; Gimingham, Butler*

— *strichnocera*, Fieb.

Derephysia foliacea, Fall. *Norwich*

Monanthia ampliata, Fieb. *Ketteringham Common; Wretham, Thouless*

— *cardui*, Linn.

— *dumetorum*, H.S. *Stratton Strawless*

— *humuli*, Fab. *Arminghall, Eaton*

HEBRIDÆ

Hebrus pusillus, Fall. *Arminghall*

HYDROMETRIDÆ

Hydrometra stagnorum, Linn.

VELIIDÆ

Microvelia pygmæa, Duf. A macropterous example, *Hickling Broad, Thouless*

Velia currens, Fab.

GERRIDÆ

Gerris rufoscutellata, Latr. *Mousehold Heath, Drayton Drewray, Thouless; Horning*

— *thoracica*, Schum.

— *gibbifera*, Schum.

— *lacustris*, Linn.

— *odontogaster*, Zett.

— *argentata*, Schum. *Arminghall*

EMESIDÆ

Ploiaria vagabunda, Linn.

— *culiciformis*, De G. *Norwich*

REDUVIIDÆ

Reduvius personatus, Linn. *Yarmouth, Paget; Norwich*

Coranus subapterus, De G.

NABIDÆ

Nabis lativentris, Boh.

— *major*, Costa

— *boops*, Schiödde. *Mousehold Heath*

— *flavomarginatus*, Scholtz

— *limbatus*, Dahl.

— *lineatus*, Dahl. *Horning, Surlingham, Cley*

— *ferus*, Linn.

— *rugosus*, Linn.

— *ericetorum*, Scholtz

SALDIDÆ

Salda pilosa, Fall.

— *saltatoria*, Linn.

— *pallipes*, Fab.

— *pilosella*, Thoms. *Salthouse, Cley*

— *opacula*, Zett. *Salthouse*

— *orthochila*, Fieb.

— *muelleri*, Gmel. *Brumstead Common, July 21st, 1887, one male; Ranworth, Champion*

— *littoralis*, Linn. *Postwick, Lakenham*

— *lateralis*, Fall.

— *cincta*, H.S.

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SALDIDÆ (continued)

Salder cocksii, Curt. *Heigham 'Canser'*

CERATOCOMBIDÆ

Ceratocombus coleopratus, Zett. *Stratton Strawless ; Ditchingham, Power*

CIMICIDÆ

Cimex lectularius, Linn.

— columbarius, Jen. *Norwich*

— pipistrelli, Jen. *Merton Hall, Lord Walsingham*

— hirundinis, Jen. *Stoke Holy Cross, Norwich*

ANTHOCORIDÆ

Lycocoris campestris, Fall.

Piezostethus cursitans, Fall. *Honing*

Temnostethus pusillus, H.S.

Anthocoris confusus, Reut.

— nemoralis, Fab.

— sarothamni, D. & S. *Hellesdon, Eaton*

— visci, Dougl. *East Carlton*

— sylvestris, Linn.

Tetraphleps vittata, Fieb. *Arminghall*

Acompocoris pygmæus, Fall.

— alpinus, Reut. One example on fir in a plantation beyond *Mousehold Heath*, Dossetor

Triphleps nigra, Wolff

— majuscula, Reut.

— minuta, Linn. *Mousehold Heath*

Xylocoris ater, Duf. *Norwich*

MICROPHYSIDÆ

Microphysa pselaphiformis, Curt. *Cossey, Swanton Morley*

— elegantula, Baer. *Norwich*, in several localities, *Thouless, Gimingham, Butler*

Myrmedobia distinguenda, Reut. *Gimingham ; Southbrepps, Butler*

CAPSIDÆ

Pithanus maerkeli, H.S.

Acetopus gimmerthali, Flor. *Stratton Strawless, Bawdeswell, Drayton Drewray*

Miris calcaratus, Fall.

— lævigatus, Linn.

Megaloceræa erratica, Linn.

— longicornis, Fall.

— ruficornis, Fourc.

Teratocoris antennatus, Boh. *Hunstanton, Weybourne, Ranworth*

— saundersi, D. & S. With the last ; also at *Brundall and Surlingham*

Leptopterna ferrugata, Fall.

— dolobrata, Linn.

Monalocoris filicis, Linn.

Bryocoris pteridis, Fall.

Pantilius tunicatus, Fab.

Lopus gothicus, Linn. *Dunston Common*

— " var. superciliosus, D. & S. *Horsford, Thouless*

CAPSIDÆ (continued)

Phytocoris distinctus, D. & S.

— intermedius, Reut.

— populi, Linn.

— tiliæ, Fab.

— longipennis, Flor.

— dimidiatus, Kbm.

— reuteri, Saund.

— varipes, Boh.

— ulmi, Linn.

Calocoris striatellus, Fab. *Ringland*

— fulvomaculatus, De G. *Foxley Wood*

— bipunctatus, Fab.

— chenopodii, Fall.

— ticinensis, Mey. *Honing, Ranworth*

— roseomaculatus, De G. *Swanton Morley, Postwick*

— infusus, H.S. *Beeston near Norwich ; Earlham, Thouless ; Southbrepps, Butler*

— striatus, Linn. *Stratton Strawless, Thouless*

Oncognathus binotatus, Fab.

Dichrooscytus rufipennis, Fall. *Norwich*

Lygus pratensis, Fab.

— atomarius, Mey. *Stratton Strawless*, on silver fir ; not recorded as occurring elsewhere in England

— rubricatus, Fall.

— contaminatus, Fall.

— viridis, Fall.

— lucorum, Mey.

— spinolæ, Mey.

— pabulinus, Linn.

— viscicola, Put. *East Carlton*

— pastinacæ, Fall.

— cervinus, H.S.

— kalmii, Linn.

Zygimus pinastri, Fall. *Sprowston, Attlebridge*

Pœciloscytus gyllenhali, Fall. *Cossey*

— unifasciatus, Fab. *Cossey*

— vulneratus, Wolff. *Yarmouth ; discovered by Thouless, September, 1897 ; not recorded as occurring elsewhere in Britain*

Campptobrochis lutescens, Schill. *Ringland*

Liocoris tripustulatus, Fab.

Capsus laniarius, Linn.

— scutellaris, Fab. *Hindolveston, Power*

Bothynotus pilosus, Boh. A macropterous male, *Boston Common*, July 8th, 1886

Rhopalotomus ater, Linn.

Pilophorus cinnamopterus, Kbm. Scotch fir, *Trowse*, August 24th, 1877 ; *Sprowston, Dossetor*

— clavatus, Linn. *Lakenham, Thetford*

Systellonotus triguttatus, Linn. *Mousehold Heath*

Eroticoris rufescens, Burm. *Stratton Strawless, St. Faiths, Drayton Drewray*

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CAPSIDÆ (continued)

- Halticus apterus*, Linn. *Bramerton*, Thouless
Strongylocoris leucocephalus, Linn. *Dunston Common*, *Hethersett*
Labops saltator, Hahn. *Yarmouth*, *Mousehold Heath*
— *mutabilis*, Fall. *Bixley*, Thouless
Macrolophus nubilus, H.S. *Swardeston*, May 15th, 1880
Dicyphus epilobii, Reut.
— *errans*, Wolff. *Mousehold Heath*, Thouless
— *stachydis*, Reut.
— *pallidicornis*, Fieb. *Ringland*
— *globulifer*, Fall.
— *annulatus*, Wolff.
Campyloneura virgula, H.S.
Cyllocoris histrionicus, Linn.
— *flavonotatus*, Boh.
Ætorhinus angulatus, Fab.
Globiceps selectus, Fieb. *Swanton Morley*
— *dispar*, Boh.
Mecomma ambulans, Fall. *Ringland*
Cyrtorrhinus caricis, Fall. *Stoke Holy Cross*
— *pygmæus*, Zett. *Coxford*, *Hellesdon*
— *flaveolus*, Reut. With the last ; also at *Ranworth* ; *Weybourne*, Butler
Orthotylus bilineatus, Fall. *Stratton Strawless*, Thouless
— *flavinervis*, Kbm.
— *marginalis* Reut.
— *tenellus*, Fall.
— *nassatus*, Fab. *Cossey*, *Heigham*
— *viridinervis*, Kbm.
— *prasinus*, Fall. *Trowse*
— *scotti*, Reut.
— *diaphanus*, Kbm. *Cringleford*
— *flavosparsus*, Sahl. *Hunstanton*, *Bran-caster*
— *chloropterus*, Kbm.
— *concolor*, Kbm.
— *adenocarpi*, Perr.
— *rubidus*, Fieb. *Yarmouth*, *Wells*
— *ericetorum*, Fall.
Loxops coccinea, Mey. *Cossey*, *Ringland*
Heterotoma merioptera, Scop.
Heterocordylus genistæ, Scop. *Wacton Common*, on *Genista tinctoria*
— *tibialis*, Holm.
Malacocoris chlorizans, Fall.
Onychumenus decolor, Fall. *Hunstanton*
Macrotylus paykulli, Fall.
Conostethus salinus, J. Sahl. *Hunstanton*
— *roseus*, Fall. *Mousehold Heath*, *Dray-ton Drewray*, *Horning*
Macrocoleus molliculus, Fall.
— *tanaceti*, Fall. *Mundesley* ; *Gimingham*, Butler
Amblytylus affinis, Fieb. *Dunston Common*
Harpocera thoracica, Fall.

CAPSIDÆ (continued)

- Byrsoptera rufifrons*, Fall. *Hellesdon*, *Dunston*
Phylus palliceps, Fieb.
— *melanocephalus*, Linn.
— *coryli*, Linn.
Atractotomus mali, Mey. *Norwich*
— *magnicornis*, Fall.
Psallus ambiguus, Fall.
— *betuleti*, Fall.
— *obscurellus*, Fall.
— *variabilis*, Fall.
— *lepidus*, Fieb.
— „ var. *roseus*, D. & S.
— *alnicola*, D. & S.
— *varians*, H.S.
— *diminutus*, Kbm.
— *sanguineus*, Fab.
— *salicellus*, Mey. *Foxley Wood*
— *rotermundi*, Scholtz
Plagiognathus albipennis, Fall.
— *viridulus*, Fall.
— *arbastorum*, Fab.
— *roseri*, H.S. *Eaton*
— *pulicarius*, Fall.
— *salitans*, Fall.
Asciodema obsoletum, D. & S.
NAUCORIDÆ
Naucoris cimicoides, Linn.
Aphelochirus æstivalis, Fab. *Cossey* ; *Earl-ham*, Brown
NEPIDÆ
Nepa cinerea, Linn.
Ranatra linearis, Linn. Near *Sparham*, *Norgate* ; *Hickling Broad*
NOTONECTIDÆ
Notonecta glauca, Linn.
— *maculata*, Fab.
Plea minutissima, Fab.
CORIXIDÆ
Corixa geoffroyi, Leach
— *atomaria*, Ill. *Horsford Heath*, *Wretham Heath*
— *lugubris*, Fieb. } *Weybourne*, *Salthouse*,
— *selecta*, Fieb. } *Cley*
— *hieroglyphica*, Duf.
— *sahlbergi*, Fieb.
— *linnæi*, Fieb.
— *limitata*, Fieb. *Ditchingham*, Power
— *semistriata*, Fieb. *Honing*, August, 1888 ; *Horning*, April, 1899
— *striata*, Linn.
— *falleni*, Fieb.
— *distincta*, Fieb.
— *fossarum*, Leach
— *mœsta*, Fieb.
— *fabricii*, Fieb.
— *præusta*, Fieb.
— *concinna*, Fieb. *Hunstanton*, Fowler
— *bonsdorffi*, Sahl.

INSECTS

CORIXIDÆ (continued)

- Corixa coleoptrata*, Fab.
- Sigara minutissima*, Linn. *Whitwell Common, Brundall, Horning*
- *scholtzii*, Fieb. *Dilham Canal*

HOMOPTERA

CICADINA

MEMBRACIDÆ

- Centrotus cornutus*, Linn. *Foxley Wood, Ketteringham*
- Gargara genistæ*, Fab. *Santon Downham, Norgate*

ISSIDÆ

- Issus coleoptratus*, Geoff. *Norwich, Cossey, Swanton Morley*

CIXIIDÆ

- Cixius pilosus*, Ol.
- *cunicularius*, Linn.
- *nervosus*, Linn.
- *brachycranus*, Fieb.
- *similis*, Kbm. *Drayton Drewray, St. Faiths*

DELPHACIDÆ

- Asiraca clavicornis*, Fab. *Earlham; Lakenham, Thouless*
- Delphax pulchella*, Curt.
- Chloriona glaucescens*, Fieb. *Ranworth, Cley*
- *prasinula*, Fieb. *Dersingham, Cley, Whitwell Common*
- *smaragdula*, Stål. *Ranworth*
- Liburnia notula*, Germ.
- *quadrinaculata*, Sign. *Booton Common, Ranworth, Flordon Common*
- *thoulessi*, Edw. *Ranworth, August, 1866, Thouless; not recorded as occurring elsewhere in Britain*
- *lineola*, Germ.
- *fuscovittata*, Stål. *Roydon Fen*
- *vittipennis*, J. Sahl
- *guttula*, Germ.
- *pallidula*, Boh. *St. Faiths, Stratton Strawless*
- *punctulum*, Kbm.
- *scotti*, Fieb.
- *collina*, Boh.
- *elegantula*, Boh.
- *boldi*, Scott. *Tarmouth, Holkham*
- *signoreti*, Scott. *Brundall, Surlingham*
- *reyi*, Fieb. *Weybourne, August, 1887; not recorded as occurring elsewhere in Britain*
- *lepida*, Boh. *Weybourne, Ranworth, Surlingham*
- *feberi*, Scott
- *leptosoma*, Flor.
- *niveimarginata*, Scott. *Booton Common, Swardston Common*

DELPHACIDÆ (continued)

- Liburnia pellucida*, Fab.
- *difficilis*, Edw.
- *discreta*, Edw.
- *discolor*, Boh.
- *forcipata*, Boh.
- *denticauda*, Boh. *Foxley Wood, Ketteringham Common*
- *exigua*, Boh. *Cley, Ringstead Downs*
- *venosa*, Germ. *Dunston Common, Booton Common*
- *aubei*, Perr.
- *striatella*, Fall.
- *fairmairei*, Perr.
- *brevipennis*, Boh.
- *straminea*, Stål. *Mousehold Heath, Stratton Strawless*
- *limbata*, Fab.
- *lineata*, Perr. *Weybourne, Arminghall*
- *mesomela*, Boh.
- Dicranotropis hamata*, Boh.
- Stiroma albomarginata*, Curt.
- *pteridis*, Boh.
- *affinis*, Fieb.
- *bicarinata*, H.S. *Booton Common*
- *nigrolineata*, Scott. *Morston*

CERCOPIDÆ

- Aphrophora alni*, Fall.
- *salicis*, De G. *Horning, Foxley Wood*
- Philænus spumarius*, Linn.
- *campestris*, Fall.
- *exclamationis*, Thunb.
- *lineatus*, Linn.

LEDRIDÆ

- Ledra aurita*, Linn. *Ringland; Fulmodeston Severals, Foxley Wood, Norgate*

ULOPIDÆ

- Ulopa reticulata*, Fab.

PAROPIDÆ

- Megophthalmus scanicus*, Fall.

BYTHOSCOPIDÆ

- Macropsis lanio*, Linn.
- Bythoscopus alni*, Schr.
- *rufusculus*, Fieb.
- *flavicollis*, Linn.
- Pediopsis scutellatus*, Boh.
- *tibialis*, Scott.
- *fuscinervis*, Boh. *Howe*
- *impurus*, Boh.
- *ulmi*, Scott. *Eaton*
- *cereus*, Germ.
- *virescens*, Fab.
- Idiocerus adustus*, H.S.
- *varius*, Fab. *Whitlingham*
- *herrichii*, Kbm. *Stratton Strawless, Caistor near Norwich; not recorded as occurring elsewhere in Britain*
- *tremulæ*, Estl. *Howe*
- *cupreus*, Kbm. *Brandon, May, 1896, one female, Thouless; the insect*

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BYTHOSCOPIDÆ (continued)

here recorded and the type appear to be the only specimens known

Idiocerus viduatus, Edw. *Foxley Wood*, September 10th, 1885; the type of this species still remains unique

- *laminatus*, Flor.
- *lituratus*, Fall.
- *pœcilus*, H.S. *Cossey, Wacton*
- *vitreus*, Fab. With the last and at *Trowse*
- *aurulentus*, Kbm. *Cossey*
- *fulgidus*, Fab.
- *populi*, Linn.
- *confusus*, Flor.
- *albicans*, Kbm.
- Agallia puncticeps*, Germ.
- *venosa*, Fall.

TETTIGONIDÆ

Evacanthus interruptus, Linn.

— *acuminatus*, Fab.

Tettigonia viridis, Linn.

ACOCEPHALIDÆ

Strongylocephalus agrestis, Fall.

— *megerlei*, Scott. *Horning, Ranworth, Surlingham*

Acocephalus nervosus, Schr.

— *bifasciatus*, Linn. *Hellesdon*

— *albifrons*, Linn.

— „ var. *interruptus*, Scott } In salt
— „ var. *polystolus*, Scott } marshes

— *brunneo-bifasciatus*, Geoff.

— *histrionicus*, Fab. *Mousehold Heath*

— *flavostriatus*, Don.

Eupelix cuspidata, Fab.

Doratura stylata, Boh.

— *impudica*, Horv. *Hunstanton, Holkham*

Paramesus nervosus, Fall.

— *phragmitis*, Boh. *Ranworth, Cley*

Glyptocephalus proceps, Kbm.

JASSIDÆ

Athysanus sordidus, Zett.

— *sahlbergi*, Reut.

— *griseus*, Zett.

— *communis*, J. Sahl

— *obscurus*, Kbm.

— *obsoletus*, Kbm.

— *melanopsis*, Hardy. *Coxford Heath*

Deltocephalus abdominalis, Fab.

— *pascuellus*, Fall.

— *citrinellus*, Kbm. *Cringleford*

— *ocellaris*, Fall. *Hellesdon*

— *repletus*, Fieb. *Stratton Strawless*, and *Brumstead, Whitwell and Dunston Commons*

— *picturatus*, Fieb. *Dunston Common, Ringland*

— *flori*, Fieb.

— *distinguendus*, Flor.

— *falleni*, Fieb.

JASSIDÆ (continued)

Deltocephalus paleaceus, J. Sahl. *Brooke Wood*; not recorded as occurring elsewhere in Britain

— *socialis*, Flor. *Barton Bendish*

— *sabulicola*, Curt.

— *striatus*, Linn.

— *normani*, Scott. *Norwich*

— *punctum*, Flor.

— *argus*, Marsh. *Mousehold Heath*

— *costalis*, Fall. *Ranworth*, September 30th, 1886; not recorded as occurring elsewhere in Britain

— *coroniceps*, Kbm. *Coxford Heath*, August 10th, 1887, one example; not otherwise known as a British insect

— *maculiceps*, Boh. *St. Faiths*

— *pulicaris*, Fall.

Allygus commutatus, Fieb. *Brooke Wood, Trowse, Arminghall*

— *modestus*, Fieb.

— *mixtus*, Fab.

Thamnotellix prasina, Fall. } *Stratton*

— *dilutior*, Kbm. } *Strawless*

— *subfuscata*, Fall.

— *variegata*, Kbm.

— *plebeja*, Fall. *Norwich*

— *striatulella*, Edw. *Roudham Heath*; not recorded as occurring elsewhere in Britain

— *splendidula*, Fab.

— *crocea*, H.S.

— *attenuata*, Germ. *Mousehold Heath*

Limotellix striola, Fall.

— *antennata*, Boh.

— *5-notata*, Boh. *Ranworth*; not recorded as occurring elsewhere in Britain

— *4-notata*, Fab.

— *sulphurella*, Zett.

Cicadula metria, Flor.

— *opacipennis*, Leth. *Ranworth*; not recorded as occurring elsewhere in Britain.

— *septemnotata*, Fall.

— *variata*, Fall.

— *fasciifrons*, Stål. *Drayton Drewray, Cley, Brooke*

— *sexnotata*, Fall.

— *fieberi*, Edw. *Weybourne, Cley, Brooke*

— *livida*, Edw. *Weybourne*, October, 1888; not recorded as occurring elsewhere in Britain

Gnathodus punctatus, Thunb. *Ringland, Earlbam*

TYPHLOCYBIDÆ

Alebra albostrigata, Fall.

Dicraneura flavipennis, Zett.

— *citrinella*, Zett.

MYRIAPODA

TYPHLOCYBIDÆ (continued)

Dicraneura similis, Edw. *Stratton Strawless*, *St. Faiths*

— *mollicula*, Boh.

— *variata*, Hardy

Kybos smaragdulus, Fall.

Chlorita flavescens, Fab.

— *viridula*, Fall.

Eupteryx vittatus, Linn.

— *notatus*, Curt.

— *urticæ*, Fab.

— *stachydearum*, Hardy

— *collinus*, Flor. *Lakenham*

— *melissæ*, Curt.

— *auratus*, Linn.

— *atropunctata*, Goeze

— *signatipennis*, Boh.

— *tenellus*, Fall. *Unthanks Road*, *Norwich*; *Earlham*

— *abrotani*, Dougl.

— *germari*, Zett.

— *pulchellus*, Fall.

— *concinna*, Germ.

Typhlocyba jucunda, H.S. *Stoke Holy Cross*, *Cossey*

— *sexpunctata*, Fall. *Ringland*, *Bixley*

— *debilis*, Dougl. *Norwich*

— *ulmi*, Linn.

— *tenerrima*, H.S.

— *aurovittata*, Dougl. *Porland*, *Feltborpe*

— *douglasi*, Edw.

— *gratiosa*, Boh.

— *cratægi*, Dougl.

— *lethierryi*, Edw.

— *rosæ*, Linn.

— *salicicola*, Edw.

— *pruni*, Edw. *Arminghall*; the type of this species remains unique

— *quercus*, Fab.

— *nitidula*, Fab.

— „ var. *norgueti*, Leth.

— *geometrica*, Schr.

Zygina alneti, Dahl.

— *coryli*, Tollin

— *flammigera*, Geoff.

— *tiliæ*, Geoff. By beating firs and ivy in spring; *Ringland*, *Drayton*

TYPHLOCYBIDÆ (continued)

Zygina hyperici, H.S. *Swanington*

— *parvula*, Boh. *Eaton*, *Bramerton*

— *scutellaris*, H.S.

PSYLLINA

LIVIIDÆ

Livia juncorum, Latr.

APHALARIDÆ

Rhinocola ericæ, Curt. *Mousehold Heath*

— *aceris*, Linn. *Ringland*

Aphalara exilis, Web. & Mohr.

— *calthæ*, Linn. *Wretham Heath*

— *artemisizæ*, Först.

— *nervosa*, Fall.

PSYLLIDÆ

Psyllopsis fraxinicola, Först.

— *fraxini*, Linn.

Psylla pruni, Scop.

— *cratægi*, Schr.

— *costalis*, Flor.

— *simulans*, Först.

— *pyricola*, Först.

— *salicicola*, Först.

— *venata*, Edw. *Stratton Strawless*; the type of this species remains unique

— *visci*, Curt. *East Carlton*

— *hippophæes*, Först. *Winterton*

— *hartigii*, Flor.

— *pineti*, Flor.

— *betulæ*, Linn.

— *costalis*, Flor.

— *peregrina*, Först.

— *mali*, Schmdbg.

— *alni*, Linn.

— *försteri*, Flor.

— *buxi*, Linn.

— *spartii*, Guér. *Hellesdon*

Arytæna genistæ, Latr. *Hellesdon*, *Eaton*

TRIOZIDÆ

Trioza albiventris, Först.

— *rhamni*, Schrk.

— *urticæ*, Linn.

— *remota*, Först.

— *galii*, Först.

MYRIAPODA

Systematic collecting of Myriapoda has never been carried on in Norfolk. Hence the materials available for forming a list of the species occurring in the county are most inadequate. The species enumerated below were casually picked up by Mr. F. Pickard-Cambridge and Mr. Oldfield Thomas on or near the broads, and by the former at West Runton, a small sea-coast village lying to the north of Cromer. All the species are forms widely distributed throughout the south of England.

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CHILOPODA

Gentipedes

LITHOBIIDÆ

1. *Lithobius forficatus*, Linn. *Syst. Nat.*, ed. 10 p. 638 (1758).
Norfolk Broads.
2. *Lithobius calcaratus*, C. Koch. *Die Myr.-Gatt. Lithobius*, p. 86 (1862).
West Runton and Ormesby Broads.

A much smaller and darker species than the preceding, and characterized by the anal legs of the male having the fourth segment swollen and tubercular.

DIPLOPODA

Millipedes

POLYDESMIDÆ

Millipedes in which the body, when adult, consists of only nineteen or twenty segments, most of which, at least in all the typical genera, are provided with a pair of lateral plates or keels bearing the repugnatorial pores. Two species only have been captured in Norfolk.

3. *Polydesmus complanatus*, Linn. *Faun. Suecic.*, ed. 2 p. 502 (1761).
Norfolk Broads.
4. *Brachydesmus superus*, Latzel. *Die Myr.*, etc., ii. p. 130 (1884).
Norfolk Broads.

The genus *Brachydesmus*, of which but one British species is known, differs from *Polydesmus* in having nineteen instead of twenty body-segments.

CHORDEUMIDÆ

Millipedes with thirty or thirty-two body-segments furnished dorsally with six symmetrically disposed bristles, without repugnatorial pores and usually keeled like those of the *Polydesmidæ*.

5. *Atractosoma polydesmoides*, Leach. *Zool. Misc.*, iii. p. 36 (1817).
Norfolk Broads.

This species, with its large keels, closely resembles an elongate *Polydesmus*.

IULIDÆ

Cylindrical millipedes with a large but variable number of body-segments, furnished with repugnatorial pores, but without large lateral plates.

6. *Iulus sabulosus*, Linn. *Syst. Nat.*, ed. 10 p. 639 (1758).
West Runton.

This handsome species may be recognized by its large size and the presence of a pair of longitudinal yellow bands running down the back.

7. *Iulus niger*, Leach. *Zool. Misc.*, iii. p. 34 (1817).
West Runton.

As large as the preceding, but uniformly black and with the anterior portion of the body-segments transversely grooved.

8. *Iulus punctatus*, Leach. *Zool. Misc.*, iii. p. 34 (1817).
Norfolk Broads.

Smaller than the two preceding species and paler coloured, with caudal process bluntly rounded at the tip. Found in rotten wood.

SPIDERS

ARACHNIDA

Spiders, etc.

So very little research has been made in connection with members of this order, so far as the county of Norfolk is concerned, that it is not possible to consider the following account of the spider-fauna of the region under consideration in any respect a full one. For while 550 and upwards of species are recorded from England and Wales, 195 species are all that have been placed to the credit of Norfolk.

That it ought to prove a rich locality however, when thoroughly well worked, cannot be doubted, if we remember that it consists of wild heather lands, semi-cultivated woodland districts and rich fen-land regions towards the east coast.

It is scarcely possible to point to any one tract as more likely to repay research than another, except that in a general way wild uncultivated districts are much more prolific than those that are highly cultured. Yet even in the latter case, where isolated areas of wild growth and forest land occur, with cultivated land on all sides, these oases are often found to be more plentifully inhabited than even huge tracts of primeval forest.

Of the 188 species of spiders recorded those deserving special mention on account of their variety are *Attus caricis*, *Lycosa spinipalpis*, *Pardosa farrenii*, *Pholcus phalangioides*, a species confined as a rule to the more southern counties, *Steatoda sticta*, *Asagena phalerata*, *Hilaira uncata*, *Mengea scopiger*, *Araneus patagiatus* and *Clubiona neglecta*.

The localities given in the following list are well authenticated, and the initials of those who collected the specimens or recorded their occurrence are added.

The greater part of the species recorded were collected by H. W. Freston, Esq., of Kersal, Manchester, many by Lord Walsingham and others by Messrs. Linstead, F. P. Smith, James Edwards and the present writer.

In cases where the generic or specific name quoted is not that under which the spider has usually been recognized in the works of English authors, a note has been added calling attention to the fact.

ARANEÆ

ARACHNOMORPHÆ

DYSDERIDÆ

Spiders with six eyes and two pairs of stigmatic openings, situated close together on the genital rima; the anterior pair communicating with lung books, the posterior with tracheal tubes. Tarsal claws, two in *Dysdera*, three in *Harpactes* and *Segestria*.

1. *Dysdera cambridgii*, Thorell.

(O. P.-C.); Scratby Cliffs (H. W. F.).

Not uncommon under stones and bark of trees, where it lurks within a tubular retreat. The spider is easily recognizable by its elongate

form, orange legs, dark mahogany carapace and pale clay-yellow abdomen. The palpal bulb of the male has no cross-piece at the apex.

This spider is also known as *D. erythrina*, Blackwall.

A HISTORY OF NORFOLK

2. *Dysdera crocata*, C. L. Koch.

(J. E.) ; Norwich (F. P. S.), May.

Larger than the last species, with a deep orange-pink carapace, orange legs, and abdomen with a delicate rosy pink flush. The palpal bulb of the male has a cross-piece at the apex.

This spider is also known as *D. rubicunda*, Blackwall.

3. *Harpactes hombergii* (Scopoli).

Walton, Cromer, Holt (H. W. F.).

Common on the heaths between Cromer

and Holt, also to be met with under bark of trees, and recognizable by its ant-like linear form, black carapace and pale abdomen, and its three tarsal claws.

4. *Segestria senoculata* (Linn.).

Cromer (H. W. F.).

Common under bark of trees, amongst detached rocks at the foot of cliffs, and in the crevices of loose stone walls. Recognizable by its linear form and the black diamond-shaped blotches on the dorsal surface of the abdomen.

DRASSIDÆ

Spiders with eight eyes, situated in two transverse rows. The tracheal openings lie just in front of the spinners. The tarsal claws are two in number, the anterior pair of spinners are set wide apart at the base, and the maxillæ are more or less impressed across the middle.

5. *Drassodes lapidosus* (Walckenaer).

Norwich (F. P. S.) ; Cromer, Runton, Cley-by-the-Sea, Ormesby (H. W. F.).

Usually common beneath stones in every locality.

6. *Drassodes cupreus* (Blackwall).

Norwich (F. P. S.).

This is a darker spider than the last. The mandibles of the male are less developed and the tibia of the palpus is shorter and broader. The central tongue of the vulva of the female is not so much dilate behind. It may be considered a sub-species.

7. *Drassodes troglodytes* (C. L. Koch).

Cromer (H. W. F.) ; Norwich (F. P. S.).

Under stones in pastures and on grass-

lands. Can be recognized by the absence of dorsal spines on the tibias of the third and fourth pairs of legs.

8. *Drassodes sylvestris* (Blackwall).

Norwich (F. P. S.).

Not uncommon amongst dead leaves in woods.

9. *Scotophæus blackwallii* (Thorell).

Ormesby Broad (H. W. F.) ; Norwich (F. P. S.).

A dark elongate mouse grey spider, often found wandering about the walls of dwellings and outhouses at night.

CLUBIONIDÆ

Spiders with eight eyes, situated in two transverse rows. The tracheal openings lie immediately in front of the spinners. The tarsal claws are two in number but the anterior pair of spinners are set close together at the base, and the maxillæ are convex, not impressed across the middle.

10. *Micaria pulicaria* (Sundevall).

Weybourne, Scratby (H. W. F.).

A small dark spider, iridescent and shining, with a white cincture round the middle of the anterior half of the abdomen. Known also as *Drassus nitens*, Blackwall.

11. *Phrurolithus festivus*, C. L. Koch.

(O. P.-C.) and Dr. Meade.

12. *Agræca brunnea* (Blackwall).

Norwich (F. P. S.).

13. *Agræca proxima* (O. P.-Cambridge).

Runton (H. W. F.).

The egg-cocoon of this species is a familiar object to the field naturalist—a white silken sac shaped like an inverted wine-glass and hung by the stem to the stalks of rushes, heather, etc. The spider subsequently covers the silk with a layer of mud.

14. *Zora spinimana* (Sundevall).

Norwich (F. P. S.) ; Watton, West Runton, Ormesby Broad (H. W. F.).

Common everywhere amongst herbage.

SPIDERS

15. *Clubiona phragmitis*, C. L. Koch.
(O. P.-C.) ; Norwich (F. P. S.) ; West Run-
ton, Ormesby Broad (H. W. F.).
16. *Clubiona pallidula* (C. Clerck).
Norwich (F. P. S.) ; Ormesby Broad (H.
W. F.).
17. *Clubiona stagnatilis*, Kulczynski.
Norwich (F. P. S.) ; Scratby (H. W. F.).
18. *Clubiona reclusa*, O. P.-Cambridge.
West Runton (H. W. F.).
19. *Clubiona lutescens*, Westring.
(O. P.-C.).
20. *Clubiona terrestris*, Westring.
Watton, Runton (H. W. F.) ; Norwich (F.
P. S.).
21. *Clubiona trivialis*, L. Koch.
Ormesby Broad (H. W. F.).
22. *Clubiona compta*, C. L. Koch.
Norwich (F. P. S.) ; Holt (H. W. F.).
23. *Clubiona brevipes*, Blackwall.
Cromer, Runton, and Ormesby Broad (H.
W. F.).
24. *Clubiona corticalis*, Walckenaer.
Norwich (F. P. S.) ; Watton (H. W. F.).
25. *Clubiona subtilis*, L. Koch.
Scratby (H. W. F.).
Common amongst the marram-grass on the
sand-dunes.
26. *Clubiona neglecta*, O. P.-Cambridge.
Norwich (F. P. S.).
An adult male and several females of this
very rare species were taken by Mr. Linstead.
27. *Chiracanthium erraticum* (Walckenaer).
Cromer, Holt (H. W. F.).
Common on the heath district between
Cromer and Holt. This spider is also known
as *C. carnifex*.
28. *Chiracanthium lapidicolens*, Simon.
Norwich (F. P. S.).
This spider is known also as *C. nutrix*.

ANYPHÆNIDÆ

The spiders of this family resemble those of the *Clubionidæ* in most respects, except that the tracheal stigmatic openings beneath the abdomen are situated about midway between the genital rima and the spinners, and not as in the last family immediately in front of the spinners. One species only is indigenous to Great Britain, and is very common amongst the foliage of trees in May and June.

29. *Anyphæna accentuata* (Walckenaer).
(James Edwards).

THOMISIDÆ

Spiders with eight eyes, situated in two transverse rows, two tarsal claws, and anterior spinners close together at their base. Maxillæ not impressed. The crab-like shape and side-long movements of these spiders are the chief characteristics which enable them to be distinguished from the more elongate *Drassidæ* and *Clubionidæ*.

30. *Philodromus dispar*, Walckenaer.
Norwich (F. P. S.) ; Watton (H. W. F.).
31. *Philodromus cæspiticolis* (Walckenaer).
Cromer, Watton (H. W. F.).
32. *Philodromus aureolus* (Clerck).
Norwich (F. P. S.) ; Runton (H. W. F.).
33. *Philodromus fallax*, Sundevall.
Runton (H. W. F.).
34. *Tibellus oblongus* (Walckenaer).
(O. P.-C.) ; Norwich (F. P. S.) ; Cromer
(H. W. F.).
Common amongst dry coarse grass on sand-
hills and also amongst the rich vegetation in
swamps, where the species is as a rule much
larger.
35. *Thanatus striatus*, C. L. Koch.
(O. P.-C.) ; Norwich (F. P. S.).
Not uncommon in marshy places and
swamps.
36. *Diæa dorsata* (Fabricius).
Brandon (James Edwards), July.
37. *Xysticus cristatus* (Clerck).
(O. P.-C.) ; Norwich (F. P. S.) ; Cromer
district, Wroxham and Ormesby (H. W. F.).
A very dark black variety occurred on the
broads close to the water's edge.
38. *Xysticus pini* (Hahn).
(O. P.-C.) ; Norwich (F. P. S.).
39. *Xysticus ulmi* (Hahn).
(O. P.-C.).
40. *Oxyptila atomaria* (Panzer).
Cromer and Holt (H. W. F.) ; Norwich
(F. P. S.).
41. *Oxyptila trux* (Blackwall).
(O. P.-C.) ; Norwich (F. P. S.).
42. *Oxyptila praticola* (C. L. Koch).
Norwich (F. P. S.) ; Watton (H. W. F.).

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ATTIDÆ

The spiders of this family may be recognized in a general way by their mode of progression, consisting of a series of leaps, when alarmed. More particularly they may be known by the square shape of the cephalic region and the fact that the eyes are arranged in three rows of 4, 2, 2; the centrals of the anterior row being much the largest and usually iridescent. Otherwise these spiders are simply specialized *Clubionids*, with two tarsal claws and other minor characters possessed in common with members of this latter family. The commonest, *Salticus scenicus*, will be well known to all observers, running and leaping on the walls of houses in the bright sunshine.

43. *Euophrys frontalis* (Walckenaer).
(O. P.-C.); West Runton, Holt, Scratby
(H. W. F.); Norwich (F. P. S.).

Abundant in most districts.

44. *Heliophantus cupreus* (Clerck).
(O. P.-C.); West Runton, Salhouse (H. W. F.).

45. *Salticus scenicus* (Clerck).
(O. P.-C.); West Runton, Salhouse (H. W. F.); Norwich (F. P. S.).

This spider is also known as *Epiblemum scenicum*.

46. *Salticus cingulatus* (Panzer).
(O. P.-C.).

Also known under Hentz's generic name *Epiblemum*.

47. *Marptusa muscosa* (Clerck).
(O. P.-C.); Norwich (F. P. S.).

One of the largest and most beautiful of our *Attidæ*, often abundant under the bark of old wooden palings, or among the loose stones of walls, such as those which cross the downlands.

48. *Attus pubescens* (Fabricius).
Norwich (F. P. S.).

49. *Attus caricis*, Westring.
(O. P.-C.); Merton Hall (Lord Walsingham).

Very rare; both sexes found on rushes in a marshy spot.

50. *Ergane falcata* (Clerck).
Norwich (F. P. S.).

51. *Dendryphantus bastatus* (Clerck).
(O. P.-C.); Drayton Drewray (F. Edwards).

PISAURIDÆ

Spiders with eight eyes in three rows, and three tarsal claws. The first row of eyes consists of four small eyes which are sometimes in a straight line, sometimes recurved and sometimes procurved. Those of the other two rows are situated in the form of a rectangle of various proportions. *Pisaura* runs freely over the herbage carrying its egg-sac beneath its sternum, while *Dolomedes* is a dweller in marshes and swamps.

52. *Pisaura mirabilis* (Clerck).
(James Edwards); Norwich (F. P. S.); Cromer, Ormesby Broad and West Runton (H. W. F.).
Known also as *Dolomedes*, or *Ocyale*, *mirabilis*.

LYCOSIDÆ

The members of this family also have eight eyes, similarly situated to those of the *Pisauridæ*, but the first row is straight. Tarsal claws three. The spiders are to be found running freely on the ground and carrying their egg-sac attached to the spinners. Many of the larger species make a short burrow in the soil and there keep guard over the egg-sac.

53. *Lycosa ruficollis* (De Geer).
Norwich (F. P. S.); Watton (H. W. F.);
Mousehold Heath and Ridgland (J. Edwards).

A very common species. The male has a claw at the end of the palpus.

54. *Lycosa terrestris* (Thorell).
(O. P.-C.); Norwich (F. P. S.); Watton (H. W. F.).

Also very common. The male has no claw at the end of the palpus.

55. *Lycosa spinipalpis*, F. P.-Cambridge.
Ormesby Broad (H. W. F.).

Females only have been taken of this rare species; the males may be known by the cluster of spines beneath the tibia of the palpus. These three species are also known under the generic name *Trochosa*.

56. *Lycosa leoparda* (Sundevall).
(O. P.-C.); Ormesby Broad (H. W. F.).

SPIDERS

57. *Lycosa perita*, Latreille.
(O. P.-C.); Mousehold Heath, Brandon,
Hunstanton, Yarmouth (J. Edwards).
This spider is also known as *Lycosa picta*,
and is common on sand-dunes.
58. *Lycosa accentuata*, Latreille.
Mousehold Heath (J. Edwards).
Known also as *Tarentula* or *Lycosa andreni-
vora*.
59. *Pardosa lugubris* (Walckenaer).
(O. P.-C.); Norwich (F. P. S.); West Run-
ton (H. W. F.).
This and the following species are also
known under the generic name *Lycosa*.
60. *Pardosa amentata* (Clerck).
(J. Edwards); Watton, West Runton, Ormes-
by (H. W. F.); Norwich (F. P. S.).
61. *Pardosa pullata* (Clerck).
West Runton and Ormesby Broad (H. W. F.);
Norwich (F. P. S.).
62. *Pardosa prativaga* (L. Koch).
Ormesby Broad (H. W. F.).
63. *Pardosa proxima* (C. L. Koch).
Ormesby Broad (H. W. F.).
64. *Pardosa monticola* (C. L. Koch).
(J. Edwards); Ormesby Broad (H. W. F.).
65. *Pardosa palustris* (Linn.).
Norwich (F. P. S.).
66. *Pardosa herbigrada* (Blackwall).
Cromer (H. W. F.); Norwich (F. P. S.).
67. *Pardosa nigriceps* (Thorell).
(O. P.-C.); West Runton and Ormesby (H.
W. F.).
68. *Pardosa farrenii* (O. P.-Cambridge).
Thetford (O. P.-C.).
This rare species has occurred hitherto else-
where only in Wicken Fen, Cambridgeshire.
69. *Pirata hygrophilus*, Thorell.
Ormesby Broad (H. W. F.).
70. *Pirata piscatorius* (Clerck).
(O. P.-C.); Merton (Lord Walsingham);
Watton and Scoulton Mere (H. W. F.).
71. *Pirata piraticus* (Clerck).
Norwich (F. P. S.); Watton, West Runton
and Ormesby Broad (H. W. F.).
72. *Pirata latitans* (Blackwall).
Ormesby Broad (H. W. F.).

AGELENIDÆ

Spiders with eight eyes situated in two straight or more or less curved transverse rows. Tarsal claws three. The species of this family spin a large sheet-like web and construct a tubular retreat at the back of it, which leads to some crevice among the rocks or the herbage, or the chinks in the walls of outhouses, wherever the various species may happen to be found. The habits of *Argyroneta* are however different.

73. *Cryphæa silvicola* (C. L. Koch).
(O. P.-C.), (Hamlet-Clark); Watton (H. W.
F.).
74. *Tegenaria derhamii* (Scopoli).
Norwich (F. P. S.); West Runton, Ormesby,
etc. (H. W. F.).
75. *Tegenaria atrica* (C. L. Koch).
Norwich (F. P. S.).
76. *Tegenaria parietina* (Fourcroy).
(James Edwards).
This spider is known also as *T. guyonii*, and
is the *T. domestica* of Blackwall.
77. *Agelena labyrinthica* (Clerck).
(O. P.-C.); Norwich (F. P. S.); Cromer,
Watton, Ormesby Broad, etc., etc. (H. W.
F.).
A very common spider, making a sheet-like
web on the herbage with a funnel-shaped
tubular retreat.
78. *Habnia elegans* (Blackwall).
Ormesby Broad (H. W. F.), (J. Edwards).
79. *Argyroneta aquatica*, C. L. Koch.
(James Edwards).
This is the well-known *water spider* which
makes a silken nest beneath the surface and
swims and dives freely, hatching out its young
within the nest.

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ARGYOPIDÆ

The spiders included in this family have eight eyes, situated in two rows, the lateral eyes of both rows being usually adjacent if not in actual contact, while the central eyes form a quadrangle. The tarsal claws are three, often with other supernumerary claws. The web is either an orbicular snare or consists of a sheet of webbing, beneath which the spiders hang and capture the prey as it falls upon the sheet. This immense family includes those usually separated under the names *Epeiridæ*, *Linyphiidæ*, etc.

80. *Meta segmentata* (Clerck).
Cromer, West Runton, Watton and Ormesby (H. W. F.); Norwich (F. P. S.).
81. *Meta merianæ* (Scopoli).
(O. P.-C.); Norwich (F. P. S.); Watton, Ormesby and West Runton (H. W. F.).
82. *Tetragnatha extensa* (Linn.).
(O. P.-C.); West Runton and Ormesby Broad (H. W. F.).
83. *Tetragnatha solandri* (Scopoli).
Watton, West Runton, Ormesby Broad (H. W. F.).
84. *Tetragnatha obtusa*, C. L. Koch.
Ormesby Broad and West Runton (H. W. F.).
This species is usually to be beaten from the lichen-covered boughs of blackthorn and willow bushes or from fir trees.
85. *Pachygnatha clerckii*, Sundevall.
(O. P.-C.); Norwich (F. P. S.); Ormesby and Watton (H. W. F.).
86. *Pachygnatha degeerii*, Sundevall.
(O. P.-C.); Norwich (F. P. S.); West Runton (H. W. F.).
87. *Cyclosa conica* (Pallas).
Walton (H. W. F.); Norwich (F. P. S.).
88. *Zilla × - notata* (Clerck).
(O. P.-C.); Cromer, Ormesby and West Runton (H. W. F.); Norwich (F. P. S.).
89. *Zilla atrica*, C. L. Koch.
Norwich (F. P. S.); Watton and Ormesby (H. W. F.).
90. *Araneus cucurbitinus*, Clerck.
(O. P.-C.); Walton (H. W. F.); Norwich (F. P. S.).
This and the following ten species are also known under the generic name *Epeira*.
91. *Araneus diadematus*, Clerck.
(O. P.-C.); Norwich (F. P. S.); Watton, Cromer and Ormesby (H. W. F.).
92. *Araneus cornutus*, Clerck.
(O. P.-C.); Norwich (F. P. S.); Ormesby and Salhouse Broads (H. W. F.).
Known also as *Epeira apoclista*.
93. *Araneus patagiatus*, Clerck.
Ormesby and Salhouse Broads (H. W. F.).
94. *Araneus scolopetarius*, Clerck.
(J. Edwards); Norwich (F. P. S.).
Known also as *Epeira sericata*.
95. *Araneus quadratus*, Clerck.
West Runton (H. W. F.); (J. Edwards).
96. *Araneus umbraticus*, Clerck.
(O. P.-C.); Norwich (F. P. S.); Watton, West Runton and Salhouse Broad (H. W. F.).
97. *Araneus redii*, Scopoli.
(O. P.-C.).
Known also as *Epeira solers*.
98. *Araneus triguttatus*, Fabricius.
(O. P.-C.).
Known also as *Epeira agalena*.
99. *Araneus adiantum*, Walckenaer.
Bungay (H. W. F.).
100. *Linyphia clathrata*, Sundevall.
Norwich (F. P. S.); Watton and West Runton (H. W. F.).
Known also as *Nerine marginata*, Blackwall.
101. *Linyphia hortensis*, Sundevall.
Ormesby Broad (H. W. F.).
Known also as *L. pratensis*, Blackwall.
102. *Linyphia pusilla*, Sundevall.
(O. P.-C.); Watton (H. W. F.).
Known also as *L. fuliginea*, Blackwall.
103. *Linyphia impigra*, O. P.-Cambridge.
(O. P.-C.); Ormesby Broad (H. W. F.).
Known also as *L. circumcincta*, O. P.-C.
104. *Linyphia montana* (Clerck).
Norwich (F. P. S.); Watton, Ormesby Broad and West Runton (H. W. F.).
Known also as *L. marginata*, Blackwall.
105. *Linyphia triangularis* (Clerck).
(O. P.-C.); Norwich (F. P. S.); Watton, Ormesby, Cromer and West Runton (H. W. F.).
Known also as *L. montana*, Blackwall.

SPIDERS

106. *Linyphia peltata*, Wider.
(O. P.-C.) ; Norwich (F. P. S.) ; Walton,
West Runton and Cromer (H. W. F.).
Known also as *L. rubea*, Blackwall.
107. *Linyphia insignis*, Blackwall.
Watton (H. W. F.).
108. *Labulla thoracica* (Wider).
Watton, Cromer and West Runton (H. W. F.).
Known also as *Linyphia cauta*, Blackwall.
109. *Floronia bucculenta* (Clerck).
Watton and Ormesby (H. W. F.).
Known also as *Linyphia frenata* (Wider).
110. *Stemonyphantes lineatus* (Linn.).
Salhouse Broad, Scratby and West Runton
(H. W. F.) ; Norwich (F. P. S.).
Known also as *Linyphia bucculenta*, O. P.-C.,
and *Neriene trilineata*, Blackwall.
111. *Drapetisca socialis* (Sundevall).
Cromer (H. W. F.).
Known also under *Linyphia socialis*.
112. *Tapinopa longidens* (Wider).
Ormesby (H. W. F.) ; Norwich (F. P. S.).
Known also under *Linyphia longidens*.
113. *Bolyphantes luteolus* (Blackwall).
West Runton (H. W. F.).
114. *Lepthyphantes obscurus* (Blackwall).
Ormesby Broad (H. W. F.).
115. *Lepthyphantes tenuis* (Blackwall).
(O. P.-C.) ; Norwich (F. P. S.) ; Watton
and West Runton (H. W. F.).
This and the following species included in
this and the next genus are usually known
under the name *Linyphia*.
116. *Lepthyphantes blackwallii*, Kulczynski.
Watton and Cromer (H. W. F.) ; Norwich
(F. P. S.).
117. *Lepthyphantes nebulosus* (Sundevall).
Norwich (F. P. S.) and (J. Edwards).
118. *Lepthyphantes minutus* (Blackwall).
Watton and Ormesby Broad (H. W. F.) ;
Norwich (F. P. S.).
119. *Lepthyphantes leprosus* (Ohlert).
Watton and West Runton (H. W. F.) ; (J.
Edwards).
120. *Lepthyphantes flavipes* (Blackwall).
Watton (H. W. F.).
121. *Lepthyphantes cristatus*, Menge.
(O. P.-C.) ; Norwich (F. P. S.).
122. *Lepthyphantes pallidus* (O. P.-Cambridge).
Norwich (F. P. S.).
123. *Bathyphantes dorsalis* (Wider).
(James Edwards) ; Ormesby Broad (H. W. F.).
124. *Bathyphantes pullatus* (O. P.-Cambridge).
Kelling Heath (H. W. F.).
125. *Bathyphantes gracilis* (Blackwall).
Norwich (F. P. S.) ; Ormesby Broad (H. W.
F.).
Known also as *Linyphia circumspecta*, Black-
wall.
126. *Sintula diluta* (O. P.-Cambridge).
Norwich (F. P. S.).
127. *Bathyphantes parvulus* (Westring).
Norwich (F. P. S.).
128. *Bathyphantes nigrinus* (Westring).
(O. P.-C.) ; Norwich (F. P. S.) ; West Runton
and Ormesby Broad (H. W. F.).
129. *Bathyphantes meadii* (O. P.-Cambridge).
(O. P. C.) ; Ormesby Broad (H. W. F.).
Known also as *Linyphia approximata* (O.
P.-Cambridge).
130. *Macrargus abnormis* (Blackwall).
Watton (H. W. F.).
131. *Centromerus sylvaticus* (Blackwall).
Norwich (F. P. S.).
132. *Centromerus expertus* (O. P.-Cambridge).
Norwich (F. P. S.).
133. *Centromerus bicolor* (Blackwall).
Norwich (F. P. S.).
134. *Centromerus concinnus* (Thorell).
Norwich (F. P. S.).
This species is very likely only a dwarf race
of the former.
135. *Mengea scopiger* (Grube).
Norwich (F. P. S.).
Known also under the name *Pedina* (præ-
occupied) and as *Linyphia rufa*.
136. *Microneta viaria* (Blackwall).
(James Edwards).
Known also as *Neriene viaria*.
137. *Micryphantes fuscipalpis*, C. L. Koch.
(James Edwards).
138. *Tiso vagans* (Blackwall).
Norwich (F. P. S.).
139. *Erigone atra* (Blackwall).
(James Edwards).
This and the next three species are known
also under the name *Neriene*.
140. *Erigone dentipalpis* (Wider).
Ormesby (H. W. F.).
141. *Erigone longipalpis* (Sundevall).
Norwich (F. P. S.).

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| <p>142. <i>Erigone promiscua</i> (O. P.-Cambridge).
Ormesby (H. W. F.).</p> <p>143. <i>Gongylidium rufipes</i> (Linn.).
Norwich (F. P. S.).
Known also as <i>Neriere munda</i>, Blackwall,
and <i>Neriere rufipes</i>.</p> <p>144. <i>Tmeticus graminicolicus</i> (Sundevall).
Norwich (F. P. S.).</p> <p>145. <i>Gonatium rubens</i> (Blackwall).
Norwich (F. P. S.); Watton and Cromer
(H. W. F.).</p> <p>146. <i>Gonatium isabellinum</i> (C. L. Koch).
Norwich (F. P. S.).
Known also as <i>Neriere rubella</i>, Blackwall.</p> <p>147. <i>Neriere cornuta</i>, Blackwall.
(O. P.-C.); Ormesby (H. W. F.).</p> <p>148. <i>Hypomma bituberculatum</i> (Wider).
(O. P.-C.); Norwich (F. P. S.); Ormesby
(H. W. F.); (J. Edwards).</p> <p>149. <i>Trachygnatha dentata</i> (Wider).
Norwich (F. P. S.); (J. Edwards).</p> <p>150. <i>Ædothorax gibbosus</i> (Blackwall).
(O. P.-C.).</p> <p>151. <i>Ædothorax tuberosus</i> (Blackwall).
(O. P.-C.).</p> <p>152. <i>Stylothorax apicatus</i> (Blackwall).
West Runton and Scratby (H. W. F.).</p> | <p>153. <i>Kulczynskiellum fuscum</i> (Blackwall).
Ormesby Broad (H. W. F.); Norwich
(F. P. S.).</p> <p>154. <i>Entelecara trifrons</i> (O. P.-Cambridge).
Merton (Lord Walsingham).</p> <p>155. <i>Arreccerus obtusus</i> (Blackwall).
(O. P.-C.).</p> <p>156. <i>Arreccerus acuminatus</i> (Blackwall).
(James Edwards).</p> <p>157. <i>Savignia frontata</i> (Blackwall).
(James Edwards).</p> <p>158. <i>Viderius anticus</i> (Wider).
(James Edwards).</p> <p>159. <i>Cornicularia unicornis</i> (O. P.-Cambridge).
Ormesby Broad (H. W. F.); Norwich
(F. P. S.).</p> <p>160. <i>Walckenaeria cristata</i>, Blackwall.
(James Edwards).</p> <p>161. <i>Troxochrus scabriculus</i> (Westring).
Norwich (F. P. S.).
Known also as <i>Walckenaeria scabricula</i> and
<i>W. aggeris</i>, Blackwall.</p> <p>162. <i>Hilaira uncata</i> (O. P.-Cambridge).
Norwich (F. P. S.).
Known also as <i>Neriere uncata</i>.</p> <p>163. <i>Maso sundevalli</i> (Westring).
West Runton (H. W. F.).</p> |
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MIMETIDÆ

Spiders of this family are similar in general respects to the *Theridiidæ*, having eight eyes and three tarsal claws. The species of *Ero* construct a small brown pear-shaped or cylindrical egg-cocoon suspended on a fine silken stalk. The legs are very spinose.

164. *Ero furcata* (Villers).
(O. P.-C.); Watton, West Runton; Ormesby Broad (H. W. F.).

THERIDIIDÆ

The members of this family have eight eyes, situated in very much the same position as those of the *Argyropidæ*, but the mandibles are usually weak, the maxillæ are inclined over the labium, and the posterior legs have a comb of stiff curved spines beneath the tarsi. The web consists of a tangle of crossing lines, and the spider often constructs a tent-like retreat wherein the egg-sac is hung up. Tarsal claws three. The legs are devoid of spines.

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| <p>165. <i>Theridion tepidariorum</i>, C. L. Koch.
(O. P.-C.); Norwich (F. P. S.).
One of the commonest spiders in our hot-
houses, and often venturing to endeavour to
acclimatize itself out of doors in the gardens.</p> <p>166. <i>Theridion sisypium</i> (Clerck).
(O. P.-C.); Watton, West Runton and
Ormesby (H. W. F.); Norwich (F. P. S.).</p> | <p>167. <i>Theridion pictum</i>, Hahn.
(O. P.-C.); Norwich (F. P. S.); Ormesby
Broad (H. W. F.).</p> <p>168. <i>Theridion varians</i>, Hahn.
Watton, West Runton, Ormesby Broad
(H. W. F.); Norwich (F. P. S.).</p> <p>169. <i>Theridion denticulatum</i>, Walckenaer.
Norwich (F. P. S.); Ormesby Broad, West
Runton (H. W. F.).</p> |
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SPIDERS

170. *Theridion tinctum*, Walckenaer.
West Runton (H. W. F.); Norwich (F. P. S.).
171. *Theridion simile*, C. L. Koch.
(James Edwards).
172. *Theridion bimaculatum* (Linn.).
(O. P.-C.); Norwich (F. P. S.); West Runton, Salhouse and Ormesby Broads and Scratby (H. W. F.).
173. *Theridion aulicum*, C. L. Koch.
West Runton (H. W. F.).
This species is also known under the name of *T. rufolineatum*.
174. *Theridion ovatum* (Clerck).
(O. P.-C.); Norwich (F. P. S.); (H. W. F.).
This spider is also known as *T. lineatum*, or under the generic name *Phyllonethis*.
175. *Theridion pallens*, Blackwall.
(O. P.-C.); West Runton and Ormesby (H. W. F.).
176. *Episinus lugubris*, Simon.
West Runton (H. W. F.).
This spider has hitherto been regarded as *E. truncatus*, Walckenaer.
177. *Pholcomma gibbum*, Westring.
(O. P.-C.).
178. *Steatoda bipunctata* (Linn.).
(O. P.-C.); Norwich (F. P. S.); West Runton and Ormesby (H. W. F.).
179. *Steatoda sticta*, O. P.-Cambridge.
(O. P.-C.).
180. *Steatoda guttata* (Wider).
(O. P.-C.); Kelling Heath (H. W. F.).
181. *Asagena phalerata* (Panzer).
Great Yarmouth (James Edwards).
182. *Pedanostethus lividus* (Blackwall).
(O. P.-C.).

PHOLCIDÆ

183. *Pholcus phalangioides* (Fuesslin).
Norwich (F. P. S.).
This is the highest northern record for the species.

DICTYNIDÆ

The species belonging to this family possess eight eyes, situated in two transverse almost parallel rows, the laterals being in contact. The calamistrum and cribellum are present, and there are three tarsal claws. They construct a tubular retreat with an outer sheet of webbing, which is covered with a flocculent silk made with the calamistrum and threads from the cribellum.

184. *Amaurobius fenestralis* (Stroem).
Norwich (F. P. S.); Ormesby Broad and West Runton (H. W. F.).
185. *Amaurobius similis* (Blackwall).
Norwich (F. P. S.); abundant everywhere (H. W. F.).
186. *Amaurobius ferox* (Walckenaer).
(James Edwards).
187. *Dictyna arundinacea* (Linn.).
(O. P.-C.); Roughton Heath and Ormesby Broad (H. W. F.).
188. *Dictyna uncinata*, Thorell.
(O. P.-C.); West Runton, Wroxham and Ormesby Broads (H. W. F.).

CHERNETES

CHELIFERIDÆ

Out of twenty species of false scorpions hitherto recorded as indigenous to Great Britain only one has been taken in this county. The various species can usually be found amongst moss and dead leaves, or beneath stones and the bark of trees. They are unmistakable on account of their possession of a pair of forcipated palpi, like those of the true scorpion. The single species which has occurred in the county was taken by Mr. Freston and myself in the environs of Ormesby Broad.

189. *Cbthionius rayi*, L. Koch.
Ormesby Broad (H. W. F.).

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OPILIONES

The harvestmen are spider-like creatures with eight long legs, the tarsi long and very flexible. Eyes simple, two in number, situated on each side of an eye eminence. Body not divided into two distinct regions by a narrow pedicle, as in spiders.

PHALANGIIDÆ

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| 190. <i>Phalangium opilio</i> , Linn.
Scratby sand cliffs (H. W. F.). | 193. <i>Oligolophus agrestis</i> (Meade).
Ormesby (H. W. F.). |
| 191. <i>Liobunum rotundum</i> (Latreille).
Ormesby (H. W. F.). | 194. <i>Nemastoma lugubre</i> (Müller).
Ormesby (H. W. F.). |
| 192. <i>Megabunus insignis</i> , Meade.
West Runton (H. W. F.). | 195. <i>Nemastoma chrysomelas</i> (Hermann).
Ormesby Broad (H. W. F.). |

CRUSTACEANS

The famous 'broads' and numerous streams of the county make it a highly promising region for freshwater Entomostraca, and good observers have established the fact that within its borders these pigmies flourish and abound. For marine crustacea its conditions are not quite so favourable. It can boast, indeed, of an extensive seaboard, and a situation open to the great expanse of the North Sea, without being so far northerly as to exclude occasional migrants from the warmer waters of the English Channel. On the other hand, the coast line is not broken up into those sheltering inlets which foster so many aquatic invertebrates. The temperature of the water is not of that equable character which makes life easy and serene. At Yarmouth the curious cancelling of the tides by southern ebb meeting northern flow, and *vice versa*, entails an indirect disadvantage. There is no great tract of shore, covered at times by the sea and at fortnightly intervals left bare, such as in some districts is so fruitful in creatures and so attractive to the naturalist. Consequently English collectors of crustacea have not much frequented this station, and for several of our records relating to the coast of Norfolk we are indebted to a German exploration of the North Sea, carried out some forty years ago on board the steamship *Pommerania*. The Malacostraca were the subject of a report by Dr. A. Metzger in the year 1875.

Of the same date, however, we have a *Report of the Fisheries of Norfolk, especially Crabs, Lobsters, Herrings, and the Broads*, by Frank Buckland, inspector of Salmon Fisheries. Ordered, by the House of Commons, to be printed, 11 August, 1875. From the title one might be inclined to suppose that herrings and broads were companion fishes. From the Sea Fisheries Act of 1868 Mr. Buckland draws the conclusion that 'a crab, therefore, is now a sea fish,' and he might have added that, by pleasure of Parliament, so also is a periwinkle. Undisturbed by such definitions, the Report adduces evidence that at Lynn there are 'no crabs or lobsters,'¹ and that there are 'no edible crabs or lobsters' at Wells, which is about twenty-nine miles east of Lynn,² but that in Lynn Harbour, and just below St. German's Bridge, shrimps have been caught in some profusion.³ Also it appears that at Wells, 'shrimps, since the new establishment was made to enclose the western salt marshes, have been very scarce in the harbour.'⁴ Small crabs, three inches or less across the back, are locally called toggs or shortcrabs, and these are very useful for bait; but to their wholesale destruction some of the fishermen attributed a general decline in the crab-catching industry.⁵

¹ *Report*, p. 30.

² *Ibid.* p. 48.

³ *Ibid.* p. 40.

⁴ *Ibid.* p. 48.

⁵ *Ibid.* p. 51. On the subsequent improvement of that industry see 'Life and Letters of Thomas Henry Huxley,' vol. ii. p. 24, 1900.

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The following remarks by the inspector himself, besides specifying the crab intended, give some useful information in regard to its habitat :

‘The crab and lobster fisheries of Norfolk, I ascertain, have their headquarters at Cromer, Sherringham, Runton, Weybourne, and the adjoining villages situated along the coast along the extreme north of the county of Norfolk. The crab pots are set out to sea from the foreshore to the distance of about two miles. The extent of the united Cromer and Sherringham fisheries is about eight and a quarter miles long by two wide. The bottom of this district consists of large flints, with a large portion of marl, in which are found occasional large rocks from one hundredweight to four hundredweight each.

‘The sea bottom is very irregular, so that a trawl net cannot be used. The whole of this sixteen square miles is a vast forest of seaweed, and is naturally a splendid breeding and feeding place for crabs. My observations in these pages are entirely confined to the edible crab (*Cancer pagurus*), and do not include the green crabs (locally called Kittawiches), or other kinds of crabs.

‘After a limit of two miles from the shore, the weeds and rocks begin to gradually disappear, and the ground begins to be what is called “spotty,” i.e. rock alternating with smooth ground. The crabs are scarce in this spotty ground.’¹

Amid the disputes of philosophers as to whether two and two always make four, or may occasionally make five, it is of interest to learn that in the Cromer district six score cast of crabs are called a hundred, and, as two crabs go to a cast, two hundred and forty in all will go to the ‘hundred.’ At this rate it is not twice two, but twice six, that make five.

The only species which Buckland mentions by its scientific name is *Cancer pagurus* (Linn.). In England scarcely any other species now comes into the market, so that to many persons a crab means this species and this alone. But in other parts of the world, where this is unknown or unprocurable, there are many different species equally or more appreciated for human food. Our own favourite belongs to the Cyclometopa, that is, to the arch-fronted tribe of the Brachyura. So also do the green crabs or kittawiches, if we may assume that by those names are intended the common shore crab, *Carcinus mænas* (Linn.). In the German report above referred to four other crabs of this tribe are recorded from the coast of Norfolk. Two of these, *Pilumnus hirtellus* (Linn.), the bristly crab, and *Pirimela denticulata* (Montagu), which Adam White calls ‘the toothed Pirimela,’ were taken by the *Pommerania* off the coast of Norfolk, at a depth of twelve fathoms, on sand.² The bristly *Pilumnus* is not uncommon. It belongs to a genus including an immense number of hairy-coated small species, which are widely distributed over the seas of the world. It has the tail part seven-jointed in both sexes. The still smaller *Pirimela* is comparatively rare, but nevertheless to be met with on many of the coasts of Great Britain and Ireland. Its colour is variable,

¹ Report, p. 50.

² Nordseefahrt der *Pommerania*, p. 291.

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sometimes greenish, sometimes brightly mottled with reds and browns, with the advantage of not being disguised by shaggy hairs. Small as it is, the diversified denticulation of its carapace gives it a look of distinction. The other crabs of the quartette in question are species of *Portunus*. The members of this genus have habits and functions which are hinted at in the trivial names, swimming crabs, fiddlers and cleansers. When an insolent fellow proposed to appoint Epaminondas to be chief scavenger, the great Theban general promised that even in such an office he would take care to serve the state efficiently. Great and small among crustacea grandly render us this service in aquatic realms, and the Portuni are called cleansers only because they are a little more conspicuous than the rest in doing this work. Most crabs are able to swim, but the Portuni and some others have an advantageous modification of structure for this purpose. The hindmost legs, instead of an awl-like ending, have the last two joints flattened out, to form, as it were, fins or oar-blades, by help of which rapid motion through the water is accomplished. Also these joints in action, being geniculated or bent one towards the other, produce some resemblance to the motions of a fiddler's elbow. In this genus, and likewise in *Pirimela*, it will be noticed that the pleon or infolded tail part of the male has only five segments distinct, whereas all the seven are distinct in the female.

Portunus pusillus (Leach) occurs all round England, chiefly in moderately deep water. Metzger reports it from twelve and fifteen fathoms on the Norfolk coast.¹ The title of dwarf fin crab, or dwarf swimming crab, well suits an animal of which, according to Bell, the ordinary length is one-third of an inch, though the measurements of its carapace may occasionally swell to four-fifths of an inch in length by a full inch in breadth.² The carapace is rugose and irregularly granulated, having the regions well marked, the lateral dents not very acute, and the three-lobed front well advanced, with the middle lobe projected beyond the other two.

Portunus bolsatus (Fabricius), reported by Metzger from twenty-three fathoms depth on this coast,³ besides being considerably larger than the largest *Portunus pusillus*, has a much smoother carapace, with sharper lateral teeth, the front not advanced, and its middle tooth not projecting beyond the others. Attention may here be called to the circumstance that all the crabs that have been mentioned have the normal five more or less acute lateral teeth or 'dents,' with the exception of *Cancer pagurus*, in which the dents become broad shallow lobes, nine in number.

In the tribe of the Oxyrrhyncha, or sharp-beaked crabs, two species were taken by the German expedition on the coast of this county, both at the same station and in the same depth as the *Pilumnus* and *Pirimela* previously noted. One of these is *Hyas araneus* (Linn.). This, by its specific name, attempts to monopolize the title of spider-crab, which is often applied to all the members of its tribe. Adam White calls it the

¹ *Nordseefahrt der Pommerania*, p. 295. ² Bell's *British Stalk-eyed Crustacea*, p. 114.

³ *Nordseefahrt der Pommerania*, p. 294.

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'great spider-crab,'¹ and in fact, by a possible stretch of sixteen inches between the tips of the longest legs of a very large specimen, it outpaces all the other English 'spiders,' with the important exception of the very much larger but less spidery-looking *Maia squinado*. The pleon is seven-segmented in both sexes, and ends broadly in both. The triangular front or rostrum projecting beyond the orbits is divided into two parts by a linear interval. The carapace is much broader in the rear than anteriorly, and has many tubercles and uncinat hairs, the importance of which has now been often explained in regard to the crabs of this group in general. They use these pegs and hooks for fastening upon themselves the rags and tags and purple or otherwise-coloured shreds of algæ and zoophytes, having a complete power of dressing or undressing themselves, or, to put it in another way, of cultivating and arranging botanical and zoological gardens on their own backs.

The other species is *Macropodia rostrata* (Linn.), described by Bell under the synonym '*Stenorynchus phalangium*' (Pennant). In the genus *Macropodia* (long-legs) the pleon has the last two segments soldered together, and it thus becomes six-segmented in both sexes. The species mentioned, though not very large, has, in accord with the generic name, very long legs, for which reason Pennant compared it to a *phalangium* or 'harvestman.' The alternative Latin names differ much more in sound than in sense, since the former signifies 'long legs with a beak,' and the latter 'narrow beak with long legs.' All the legs except the chelipeds are extremely slender. The owner does not use them for rapid movement, being of the lethargic sedentary habit common in its costuming tribe. In spite, however, of its disguises and its retiring disposition, fishes are able to find it out and fill their stomachs with it.²

Turning now to the Macrura, or long-tailed malacostracans, out of the five divisions of the tribe Anomala we shall find three represented in our records, and we may take for granted that a fourth, containing the hermit-crabs, is more or less abundant here, as on every other coast provided with univalve mollusca. Any one who has drawn a curly-tailed 'hermit' out of his borrowed shell will readily understand that among lobsters and prawns its position is rather anomalous. In the other divisions the anomaly is not always quite so obvious, for some have a decidedly lobster-like appearance. On the other hand, many might be mistaken by the uninitiated for genuine crabs. Especially is this the case with the first to be mentioned. In *The Perustrations of Great Yarmouth and Gorleston and Southtown*, by Charles John Palmer, F.S.A., it is stated that 'in 1869 there was brought on shore a specimen of the *Lithodes Arctica*, or Arctic crab, which was forwarded to Mr. Buckland.'³ This, which is more correctly called *Lithodes maia* (Linn.), and is known in English as the northern stone-crab, is seldom taken far to the south, though species of the same genus are known from tropical waters and the Strait of Magellan. It is a large species, very spiky, with spikes on

¹ *Popular History of British Crustacea*, p. 22.

² *British Stalk-eyed Crustacea*, p. 5.

³ Vol. iii. p. 242, 1875.

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the pleon, spikes on the rostrum, spikes all over the carapace and most of the legs, and yet its armature, which has earned it the alternative name of the 'devil crab,' does not prevent its being swallowed by the cod. In a dorsal view it might be taken for a crab in reality, but the pleon tells a different tale. In the female this part is greatly expanded, far more so indeed than in crabs proper, but the intrinsic anomaly of it is that the segments following the second are not simple, and, what is more, they are not symmetrical. The disconnected crustaceous pieces in the leathery skin on one side are much larger than those on the other. The want of symmetry brings to mind the tail part of the hermit-crabs, and it is from their type that *Lithodes* is supposed to have descended, with re-modification of the tail, to suit its altered conditions of life, when the piratical seizure of mollusc shells was dispensed with. To one other anomaly attention should be directed. This species, which belongs to the decapods, or ten-footed crustacea, looks as if it had only eight legs. The truth is that, as in almost all the *Anomala*, the last pair are very small; but besides this they are here tucked away out of sight beneath the margin of the carapace. In this situation they do not need, or rather they do need not, to be spiky, and they are not.

Strangely contrasting in size with the preceding is the little *Porcellana longicornis* (Linn.), with a carapace not a quarter of an inch long or broad. It represents a different division of the *Anomala*, in which the pleon is symmetrical and closely folded under the body in a crab-like fashion, but it is comparatively broad, and ends in a way not found in the *Brachyura*, though familiar in the *Macrura*. On each side of the seventh segment or telson are the two-bladed appendages of the sixth segment, these five plates together forming a fan, which in many genera constitutes a powerful swimming organ. As the generic name implies, this 'minute porcelain crab' has a smooth carapace. Its specific name declaring that it has 'long antennæ,' also by that fact is suggestive of its not being a true crab. It is reported by Metzger from the Norfolk coast at a depth of twelve to twenty-five fathoms.¹ It is very common.

From the same locality, at a depth of twelve fathoms, Metzger records *Galathea squamifera* (Leach),¹ the scaly galathea. In the division to which this belongs there is the swimming fan at the end of the pleon, but that pleon is not closely adpressed to the trunk and is developed more after the style of lobsters and crawfishes.

In his *Perlustration of Great Yarmouth* Mr. Palmer makes the following remarks: 'In July, 1873, two specimens of the crab (*Limulus Longa Spina*) were brought in by a fishing smack. The Malays use the long spines of these crabs as tips to their lances and arrows. Shrimps, the least but most delicious of all shell-fish, abound at Yarmouth, and are caught in large quantities during the summer months, giving employment to many industrious men.'² *Limulus longispina* (Van der Hoeven) is a native of Japanese waters, and should not lightly be included in the fauna of Norfolk, even if the fishing-smack obtained the specimens so named alive

¹ *Nordseefahrt der Pommerania*, p. 292.

² Vol. iii. p. 242, 1875.

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from the neighbouring sea. But the canny fishermen may have received dead specimens from a passing vessel, or the species may really have been the North American *Limulus polyphemus* (Linn.), which is caught by the million on the shores of the United States. *Limulus*, by the great size of its representatives, seems to deserve its name of king-crab, but, unfortunately for the name, it is not a crab at all. According to one set of disputants in a lively controversy, it is not even a crustacean, but an arachnid. Interesting as it is in itself, we must therefore reluctantly leave it alone, and pursue a humbler theme.

Of Mr. Palmer's twofold statement that shrimps, meaning the edible shrimps of this country, are the least but most delicious of all shell-fish, the first part, that they are the least, is too untenable to need discussion; the second part, that they are the most delicious, is a question of taste. Some men prefer oysters. But oysters have at least this advantage, that they really are shell-fish. Shrimps are not so, unless we please to follow dictionaries and Acts of Parliament in a defunct classification which mixes up crustaceans with molluscs. Shrimp itself is a vague expression, indefinitely defined by Webster as 'a long-tailed decapod crustacean of the genus *Crangon*, and others; often applied to most of the smaller macrourans.' Probably Palmer refers to the widely diffused and extensively consumed *Crangon vulgaris* (Linn.), the 'common shrimp.' With this is sometimes found the *Crangon allmanni* (Kinahan), which can be distinguished by the longitudinal groove on the back of the penultimate segment of the pleon, continued in shallower form on the terminal segment or telson. Because of this groove it is called by Adam White the 'channel-tailed shrimp.' Metzger records it from twelve fathoms on the Norfolk coast.¹ It is so like its 'vulgar' relation that often no doubt it passes under the eyes and palate of the unobservant as though it were itself a common shrimp.

The tribe Caridea, to which shrimps and prawns collectively belong, is distributed into several divisions and numerous families. As of shrimps, so of prawns, there are numerous species and genera. The serrate sword projecting from the head is a fairly good mark of such prawns as are likely to be met with at English tables. Compared with the prawns of the whole world, those of England form an insignificant group, but they are not confined to a single species, nor even to a single genus. From various notices one is led to infer that *Leander serratus*, 'the common prawn,' is in Norfolk less common than *Pandalus montagui* (Leach), sometimes less correctly called *Pandalus annulicornis*. This has rings of red and white alternating on its antennæ, and White gives its name in English, without much regard to euphony, as the ringed-horned prawn.² Leach, in 1815, writes: 'It is used at Yarmouth as an article of food, and is at that place so much esteemed for the table as to afford constant employment during the summer season to several fishermen, who take it in abundance at a considerable distance from the shore, and name it from that

¹ *Nordseefahrt der Pommerania*, p. 290.

² *Popular History of British Crustacea*, p. 126.

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circumstance the sea-shrimp.'¹ In this genus the first trunk-legs are so far from being developed into monstrous claws that they were long described as simple, a technical expression for limbs that have no grasping power. But Dr. Calman has recently pointed out that they do in fact end in a thumb and finger, though the chela so formed is of only microscopical proportions. Very commonly parasitic on this prawn is another crustacean, an isopod called *Hemiarthrus abdominalis* (Kröyer), which may be discussed at another opportunity. Its occurrence might have been taken for granted, but it is actually reported by Metzger.³

Not all prawns find salt water a necessity of existence. There are many which are able to live at will also in brackish water or fresh. Among these is *Palæmonetes varians* (Leach), which may be met with in several English counties. The genus is separated from *Leander* by the absence from its mandibles of the so-called palp. The very same distinction between nearly allied genera is met with in other parts of the class Crustacea, and in some of the instances it is difficult to understand why one set of forms should discard what the other set retains. In *Palæmonetes varians*, it should be further observed, the frontal sword or rostrum is straight, entire at the tip, with two teeth on the under margin, and four to six on the upper. Its occurrence in Norfolk is noticed by Bell;² but there is, I imagine, an indirect reference to it also in the following argumentative and singular record, to which my attention was called some time ago by Mr. Whitaker, lately president of the Geological Society. The passage is in Mr. S. B. J. Skertchly's *Memoir on Fenland*.⁴ It is headed 'Living Prawns in the Silt.'

'In the summer of 1873 I investigated a curious case of the entombment of the ova of prawns in the marine silt for a lengthy period. Mr. S. H. Miller directed my attention to the case, and accompanied me on my visit. The facts were communicated to *Land and Water*, and specimens were got which lived for a long time in the Brighton Aquarium.

'At Walsoken brickyard, near Wisbech, pits are sunk in the clay, and in the year 1859 a bed of fine sand or silt was pierced at a depth of fifteen feet. From this bed a strong salt spring rose, the water of which was much more saline than that of the river in the neighbourhood, and this, mixing with the fresh water in other parts of the pit, rendered it so brackish as to kill the pike, though the carp, tench and insects seemed unaffected by the change. Shortly after this incursion of salt water prawns began to appear in the pit, and the supposition is that their ova were embedded in the marine silt and kept alive by the salt water with which the bed was charged, and that the recurrence of favourable conditions of open water and light enabled them to hatch, and since that time they have abounded in the pits. The largest individuals are about

¹ *Malacostraca Podophthalmata Britannia*, text to pl. 40, March, 1815.

² *Nordseefahrt der Pommerania*, p. 286.

³ *British Stalk-eyed Crustacea*, p. 310.

⁴ pp. 241-243, 1877, reprinted in *Geol. Survey Mem.*, sheet 65, p. 135, 1893.

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2½ inches in length, a size never attained in the river, nor, I believe, in the Wash itself.

‘The position of the pits is about three-quarters of a mile from the Roman banks on the land side, and a mile and a half from the river Nene, up which the same species comes with the tide.

‘There are many pits in this district in which the water rising from the silt is brackish, but I have never met with another case in which marine organisms were found living, though nearly every pit within an area of 1,000 square miles was examined. In some places a communication is kept up with the sea by beds of quick-silt, and wells become distinctly brackish during high spring-tides. In the present instance such does not seem to be the case, and one is driven to the conclusion that the prawns must have been introduced accidentally, or that the ova were embedded in the silt itself.

‘It is highly improbable that the prawns were introduced wilfully for the mystification of naturalists, for the latter are rarer than prawns about here, and the time of the appearance of the prawns just after the spring was tapped, and the fact of them all being very small at first are in favour of a natural mode of introduction. Neither is it probable that the ova were introduced by sea-birds in one of their very rare visits to this pit, for the ova are carried by the females until they hatch, and could not become attached to the bird, neither could they have survived the process of digestion as some seeds do. Besides, considering the great number of open pits hereabouts which have been unused for years, and so afford much better protection for sea-birds, the introduction of prawns ought to have been more general on such a supposition. True, most of the pits contain fresh, or only slightly brackish water, but prawns seem to live almost as well in fresh as in salt water, and I have frequently noticed them miles above locks on tidal streams, where the water is not even approximately brackish. The prawns in question were kept for weeks in fresh water, and they were then killed by accident. Nevertheless, in no other pit have they been found, though they would hardly escape notice, since these spots afford valuable fishing resorts.

‘The balance of evidence is decidedly in favour of the burial of the ova in the silt, which is so quick as to be dangerous to stand upon, and would afford plenty of water for their preservation. The only difficulty attaching to this supposition is the length of time during which the ova must have lain dormant. The Roman banks are about 1,700 years old, and at least 3,000 years must have elapsed since the area of the pits at the depth in question was covered with sea water. Yet I see no other explanation, and am strongly inclined to believe such to have been the case.’

On this passage several comments may be made. The author seems to speak of prawns as if they all had the same habits and were all of one species. That he is really speaking of *Palæmonetes varians* has to be inferred from the statement that specimens lived for weeks in fresh water. On the other hand, a size of 2½ inches, though often

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attained by the common prawn, is certainly very unusual for the *Palæmonetes*. Like the eels entrapped in the pits at Rome, it may in an unusual situation attain an unusual size. It may find congenial food and be free from harassing foes. That condition of things helps one to grow fat. As to the incidental sarcasm on the paucity of north Norfolk naturalists, it may in itself have been well deserved, but there is no coast far or near on which naturalists can hope to compete in numbers with the prolific prawn. Mr. Skertchly's own argument is invalidated by one startling inconsistency, since he first affirms that 'the ova are carried by the females until they hatch,' and presently afterwards sums up in favour of a supposition that the ova had been buried in the silt and lain dormant for an enormous period. He can scarcely intend that they were buried with the parent and survived the unpleasant contiguity of her decay. He speaks also of the silt affording plenty of water for their preservation. But it is, I believe, the fact that crustacean ova which are known to retain vitality for a long time without hatching out belong exclusively to the Entomostraca, and that they are preserved in dried mud, not in moist. The life history of such species has been adapted to their residence in water-basins which are liable to complete evaporation, to be followed by replenishing at a future season. No such expedient could be necessary for the prawn. But, where strong springs can rise in a pit, there seems to be no reason why the tiny larval prawns should not be carried safely along with the water. At any rate, the survival of malacostracan eggs during thousands of years cannot be accepted on existing evidence.

Nearly related to the shrimps and prawns in appearance, and perhaps also in fact, are the Schizópoda, the order of the cloven feet. They are so called because many of their legs have two branches. But this is the case also with lobsters and many other crustaceans in their juvenile stages; and a few of the Macrura retain the second branch even in adult life. In the pleon, moreover, double-branched appendages are rather the rule than the exception. Of schizopods, Norfolk has at least one on record—the pretty and delicate, black-eyed, almost transparent *Gastrosaccus spinifer* (Goës). The hind margin of its carapace forms an elegant curve, fringed within by eight acute denticles.¹

Of the sessile-eyed Malacostraca, I have in my possession a specimen of the isopod *Astacilla longicornis* (Sowerby), taken off Yarmouth by Dr. G. S. Brady, F.R.S., by whom also the schizopod just mentioned was obtained. Of the Isopoda, it may suffice here to remark that the county is sure to yield by land and water a long list of species to any naturalist who will, with moderate diligence, search for them. Of another sessile-eyed group, the Amphipoda, much the same may be said. Of these, Metzger's catalogue contains the following names: *Dryope crenatipalmata*, Bate; *Noenia excavata*, Bate; *Aora gracilis*, Bate; *Microdeutopus anomalus*, Rathke; *Ampelisca tenuicornis* Lilljeborg; *Melita obtusata*

¹ A. M. Norman, in *British Association Report* for 1868, p. 268; Stebbing, in *Annals and Magazine of Natural History* for August and October, 1880.

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(Montagu), *Paramphithoe bicuspis* (Kröyer).¹ For the first of these the name should now stand as *Unciola crenatipalma* (Bate); for the second, as *Podoceroopsis rimapalma* (Bate). *Gammarus pulex* (Linn.), in dredged material from the Norfolk broads, has been recorded by Brady and Robertson.² Recently the occurrence of a well-shrimp in Norfolk has been reported by Dr. Sidney Harmer, F.R.S. 'In January, 1899,' he says, 'I received two living specimens of *Nipbargus* from my father's house at Cringleford, near Norwich. The well, which is about twenty-five years old, is forty feet deep, including some three or four feet of water. It is sunk in the chalk, which at that spot comes within two or three feet of the surface and is overlaid by humus only.'³

He determines this interesting amphipod to be *Nipbargus aquilex* (Schiödte). The distribution of well-shrimps obviously suggests the same problem as that which Mr. Skertchly discusses about the prawns in the silt, the question being, How in the world did they get there? As already intimated the answer, to my thinking, is easy, that the channels which carry the water carry also the crustaceans.

For another welcome addition to the amphipods of the county we are indebted to Mr. Henry Scherren, F.Z.S., who discovered *Corophium crassicorne*, Bruzelius, in a very unexpected situation. When sending me the specimens, he says, in a letter from Yarmouth, August 7th, 1896: 'They were taken in the river Thurne, not far from the broad which the Law Courts recently declared was not tidal. The nests were on *Cordylophora lacustris*, which is extremely abundant. To-day I have found *C. lacustris* at Acle Bridge, on the Bure. This last is a new locality for *C. lacustris*, and I assure you I was surprised to meet with this crustacean [the *Corophium*] there. I have secured good specimens of the Hydrozoon [the *Cordylophora*] with nests [of the *Corophium*] on the branches for the British Museum.' Mr. Scherren was subsequently at the pains to ascertain that the salinity of the water in which this usually marine amphipod abounded was only about one-thirtieth of that of the sea water off Yarmouth Jetty.

To dwell still further on the feeble catalogue of Norfolk amphipods, I must once more recur to Mr. Palmer's *Perlustration*. At page 229 he records that 'On the 8th of July, 1784, a small whale (*Balaena mysticetus*) was taken near Yarmouth.' Also, he says, 'In 1857 a whale was stranded on Winterton Beach, which measured forty-five feet in length.' But our present concern with the stranding of the Greenland or Right Whale on the coast of Norfolk relates only to the parasitic amphipod, *Cyamus ceti* (auctorum), or *Cyamus mysticeti* (Lütken), the curious so-called whale-louse, an amphipod of the tribe Caprellidea, which is almost invariably the whale's companion.

Passing now from the Malacostraca to the next great division of the crustacea, we shall have the assistance of some very acute and diligent

¹ *Nordseefahrt der Pommerania*, pp. 278-282.

² *Annals and Magazine of Natural History*, Ser. 4, vol. vi. p. 7, 1870.

³ *Trans. Norfolk and Norwich Naturalists' Society*, vol. vi., pt. v. pp. 489, 490.

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observers, Dr. G. S. Brady, Dr. David Robertson, and the Rev. Dr. Norman. In a joint paper the first two say : 'The Entomostraca of the tidal waters of Norfolk, Suffolk, and the Cambridge fen district constitute so remarkable a group that it seems best to speak of them separately ; and in so doing we shall call the area to which we refer the *East-Anglian district*, understanding by that term the whole tract drained by the rivers Nene, Cam, Bure, Yare, and Waveney.'¹ They think it possible that the fen district of Lincolnshire may also have been continuous with the other tract in former times. They discuss the changes which the physical features of East Norfolk have undergone, making a sea-covered bank the site of a large town, and leaving lakes and tortuous streams where was once a marine expanse. They give evidence that the process of silting up is still at work. Finally, they draw the following conclusions : 'There can be no difficulty, then, in understanding how a fauna, introduced when the whole East-Anglian district was overspread by the sea, should hold its ground for a lengthened period, while its habitat was year by year becoming less subject to marine influences, and that the more hardy or more plastic species should remain even after fresh water entirely usurped the place of salt, while at the same time a new fauna derived from the landward side was also gradually establishing itself, as the conditions of existence became more favourable.'² From numerous surface gatherings the two authors obtained a considerable collection of Entomostraca belonging to various groups, but these were swimming species of purely freshwater character, such as might have been found, they explain, in any British waters of like extent. In their dredged material, on the other hand, they found several new and peculiar Ostracoda. As these little bivalved crustaceans in outward appearance are just like bivalved molluscs, when only empty valves are found, confusion easily arises. Accordingly, what was described by Brady and Robertson in 1870 among the Ostracoda of the Norfolk Ouse as *Goniocypris mitra* nov. gen. et sp., is explained by Brady and Norman in 1889 to be the fry of the mollusc *Anodonta cygnæa*.³ Another form, *Polycheles stevensoni*, which they found in the Ouse and many other localities, was a genuinely new discovery, both as to genus and species ; but the generic name was twice changed, first into *Darwinella* and then into *Darwinula*, both *Polycheles* and *Darwinella* being pre-occupied. The species now stands by itself in the Darwinulidæ, third family of the section Podocopa. *Argillæcia aurea*, Brady and Robertson, is made a synonym of it by Brady and Norman in 1889.⁴ In the Cytheridæ, the fourth family of the same section, stands *Metacypris cordata*, another new genus and species, discovered by Brady and Robertson in Wroxham and Barton broads, and at other East-Anglian

¹ *Annals and Magazine of Natural History*, ser. 4, vol. vi. p. 3, 1870. ² *Ibid.* p. 4.

³ *Monograph of the Marine and Freshwater Ostracoda of the North Atlantic and of North-Western Europe*, section I., 'Podocopa,' by George Stewardson Brady, M.D., F.R.S., F.L.S., and the Rev. Alfred M. Norman, M.A., D.C.L., F.L.S. ; *Trans. Royal Dublin Soc.*, ser. 2, vol. iv. p. 120.

⁴ *Ibid.* p. 122.

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stations. In this the shell seen from above is heart-shaped in the female, broadly ovate in the male. The colour is green, with irregular blotches of darker green, or black. The length is half a millimetre, or one-fiftieth of an inch.¹ As further especially characteristic of the East-Anglian district, Brady and Robertson name *Cythere fuscata*, described by Brady in 1868. It occurs in Horsey Mere, Hickling and Ormesby broads, the Ouse and the Bure, and, according to Brady and Norman, 'is confined to estuarine and brackish or sub-brackish situations in Holland and the East of England.'²

The following species are also recorded definitely from Norfolk :

Cyprinotus fretensis (Brady and Robertson), from Breydon Water and Somerton Broad. Brady and Norman, in 1889, regard this, and also *Cypris salina* (Brady), as synonyms of *Cypris prasina* (Fischer), taking Brady's banded *salina* as the typical form of the species, *fretensis* as an unbanded variety ; while of Fischer's *prasina* they remark that 'in Fischer's description certain markings are noticed somewhat vaguely, but are not given in the figures accompanying his memoir.'³ Professor Sars, however, in 1890, upholds two species distinct from Fischer's as *Cyprinotus salina* (Brady) and *Cyprinotus fretensis* (Brady and Robertson).⁴ Then, in 1896, Brady and Norman, after quoting from Sars a re-definition of Brady's *Cyprinotus*, perplexingly add, 'To the genus *Cyprinotus*, thus defined, is probably referable the following : *Cyprinotus prasinus* (S. Fischer) (= *Cypris salina*, Brady and Norman, pt. i. p. 78).⁵ *Salina* must be a slip of the pen for *prasina*, and the learned authors leave us in doubt whether they now agree with Sars in making *prasinus*, *salinus*, and *fretensis* three independent species, or with their former selves in uniting them into one.

Cypridopsis aculeata (O. G. Costa), from many of the broads of Norfolk and Suffolk. The specific name given by the Italian author was, independently, some years later given to this species by the Swedish author Lilljeborg.⁶ That an aculeate shell should twice suggest the name *aculeata* cannot be claimed as a miraculous coincidence.

Pionocypris obesa (Brady and Robertson), from Norfolk broads and the Ouse, near Lynn. The species was at first referred to *Cypridopsis*. The new generic name given by Brady and Norman in 1896 signifies the fat cypris. As obesity is more than hinted at in the specific name also, it should be noted that it is only a tumid shell not a sebaceous animal, on which these epithets are piled. It may be only a variety or a synonym of *Pionocypris vidua* (Müller), widely distributed in fresh water. The 'widow' (*vidua*) has coloured bands with which her 'fat friend' dispenses.⁷

¹ *Ann. Nat. Hist.*, ser. 6, vol. iv. pp. 5, 20, 30 ; *Monograph*, p. 123 (in almost all cases the works here cited either supply or give references to plates in which the several species are figured).

² *Monograph*, p. 148.

³ *Ibid.* p. 78.

⁴ *Oversigt af Norges Crustaceer*, in *Forh. Selsk. Christian.*, 1890, p. 56.

⁵ *Monograph*, pt. ii. p. 722.

⁶ *Ibid.* pt. i. p. 90 ; pt. ii. p. 725.

⁷ *Ibid.* pt. i. p. 89 ; pt. ii. p. 726.

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Notodromas monacha (Müller), from Somerton Broad.¹

Candona candida (Müller), from Wroxham Broad, and other localities.² 'The ordinary form of *C. candida* occurs commonly in ponds and ditches; the variety *tumida* is most common in rivers and dykes subject to tidal influences, and in the fen district of Norfolk and Suffolk.'³

Candona lactea, Baird, from Norfolk broads and other waters.⁴ This is described as resembling the young of *C. candida* with the difference that the latter is obliquely rounded behind, while *lactea* is evenly rounded at both ends.⁵

Candona compressa (Koch), from the Norfolk broads. Like some others already mentioned, this species will illustrate the difficulties of identification that sometimes occur in this group of numerous, small and closely-related forms. Brady and Robertson, in 1870,⁶ record two species, *C. albicans*, Brady, and *C. compressa* (Koch), which Brady and Norman, in 1889,⁷ unite under the name *C. pubescens* (Koch) but in 1896⁸ the latter authors accept the title *C. compressa* (Koch) in place of their *C. pubescens* from Norfolk, leaving the true *C. pubescens* to Essex and Bedfordshire.

Candona fabæformis (Fischer), from Ormesby Broad. A form which was named *C. diaphana* by Brady and Robertson is made a synonym of this 'bean-shaped' *Candona* by Brady and Norman.⁹

Candona hyalina, Brady and Robertson, from Barton Broad, and perhaps also from Wroxham and Ormesby broads.¹⁰

Candona acuminata (Fischer), from Hickling Broad.¹¹

Candonopsis kingslei (Brady and Robertson), from the Norfolk broads. This species was transferred from *Candona* to a new genus, *Candonopsis*, by the Bohemian author Vávra, in 1891.¹²

Argillæcia cylindrica, G. O. Sars, from the Norfolk Ouse.¹³

Cythere pellucida, Baird. Brady and Norman say: 'This is essentially a brackish water species, and is found all round the coasts of Great Britain and Ireland in salt marshes and estuaries, and in rivers as far as, or even further than, the tidal influence extends. We have found it in places as far inland as Whittlesea, and in several of the Norfolk and Suffolk broads. It occurs also not uncommonly in dredgings from shallow water up to 4 or 5 fath., and less commonly up to 30 fath.'¹⁴

Cythere confusa, Brady and Norman, from Breydon Water, Norfolk, and from the rivers Ouse alike of Norfolk and Yorkshire. Brady and Norman speak of it as more strictly a marine species than *C. pellucida*, and not so universally found in tidal or brackish waters, but more abundantly in deep water all round our coasts.¹⁵

¹ *Monograph*, pt. i. p. 96.

² *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 16.

³ *Monograph*, pt. i. p. 99.

⁴ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 30.

⁵ *Monograph*, pt. i. p. 100.

⁶ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 30.

⁷ *Monograph*, pt. i. p. 101.

⁸ *Ibid.* pt. ii. p. 728.

⁹ *Ibid.* pt. i. p. 103.

¹⁰ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 18; *Monograph*, pt. i. p. 247.

¹¹ *Monograph*, pt. i. p. 104.

¹² *Ibid.* pt. i. p. 102; pt. ii. pp. 720, 731, 743.

¹³ *Ibid.* pt. i. p. 111.

¹⁴ *Ibid.* p. 126.

¹⁵ *Ibid.* p. 127.

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Cythere (?) *semipunctata*, Brady, from the Norfolk Ouse.¹

Cythere emaciata, Brady, from the Ouse at Lynn.²

Cythere antiquata (Baird), from Breydon Water and the river Bure.³ Baird, in describing the shell, says, 'The whole circumference is wrinkled, and the shell presents a very antiquated appearance.'⁴ G. W. Müller, in his great work on the Mediterranean Ostracoda, 1894, refers this species to the genus *Cythereis*, Rupert Jones.

Cythere villosa (Sars), from Norfolk coast, taken by Mr. D. O. Drewett.⁵

Cythere latimarginata (Speyer). A single specimen, possibly fossil, was dredged in the Ouse at Lynn.⁶

Cythere finmarchica (Sars), from the Norfolk Ouse.⁷ This and the two preceding species, placed in the genus *Cythereis* by Sars, are allotted to *Cythere* by Brady and Norman.

Limnocythere monstifica (Norman), from Breydon Water and the Ouse at Lynn.⁸

Cytheridea torosa (Rupert Jones), from the Norfolk broads and river Ouse.⁹

Cytheridea elongata, Brady, taken off Yarmouth by Mr. D. O. Drewett.¹⁰

Loxoconcha guttata (Norman), from the Bure.¹¹

Loxoconcha viridis (Müller), from the Norfolk broads. It is described as almost ubiquitous in the British islands in brackish and sub-brackish situations.¹²

Loxoconcha multifora (Norman), from the Ouse.¹³

Loxoconcha pusilla, Brady and Robertson, from the Ouse.¹⁴

Cytherura gibba (Müller), found in many of the Norfolk broads and the Ouse.¹⁵

Cytherura striata, Sars, from the Ouse.¹⁶

Cytherura angulata, Brady, from the Ouse.¹⁷

Cytherura clathrata, Sars, from the Ouse at Lynn, and also dredged off Yarmouth by Mr. D. O. Drewett.¹⁸

Cytherura cellulosa, Norman, from the Ouse.¹⁹

Cytherura simplex, Brady and Norman, and *Cytherura fulva*, Brady and Robertson, are also recorded from the Ouse, the Norfolk Ouse, without doubt, being intended.²⁰

Cytherois fischeri (Sars), specifically mentioned from Breydon Water

¹ *Monograph*, pt. i. p. 130.

² *Ibid.* p. 159.

³ *Ibid.* p. 168.

⁴ *British Entomostraca*, p. 176.

⁵ *Monograph of the Recent British Ostracoda*, by G. S. Brady (*Trans. Linn. Soc.*, vol. xxvi. p. 411).

⁶ *Monograph*, pt. i. p. 156.

⁷ *Ibid.* p. 163.

⁸ *Ibid.* p. 172.

⁹ *Ibid.* p. 175.

¹⁰ *Trans. Linn. Soc.*, vol. xxvi. p. 411.

¹¹ *Monograph*, pt. i. p. 184.

¹² *Ibid.* p. 185.

¹³ *Ibid.* p. 185.

¹⁴ *Ibid.* p. 186.

¹⁵ *Ibid.* p. 190.

¹⁶ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 33.

¹⁷ *Monograph*, pt. i. p. 206.

¹⁸ *Trans. Linn. Soc.*, vol. xxvi. p. 446.

¹⁹ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 34.

²⁰ *Monograph*, pt. i. pp. 200, 205.

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and the Ouse, and also generally stated to occur 'in the rivers and broads of the East-Anglian fen district.'¹

Paradoxostoma variabile (Baird), from the Ouse. Baird describes this species as rejoicing in a variety of colouring, which will please or exasperate the naturalist according to taste. Its shell may be almost black, or of a uniform dark brown, or altogether of a fine flesh colour, or of a light flesh colour with greenish edges and the centre crossed by dark streaks, or it may be white with one black band across the middle and another behind attended by a beautiful reddish or bright bronze spot.²

Paradoxostoma abbreviatum, Sars, from the Ouse.³

Paradoxostoma ensiforme, Brady, from the Ouse.³

Paradoxostoma normani Brady, from Breydon Water.⁴

Paradoxostoma flexuosum, Brady, from the Ouse, but in this case the Yorkshire Ouse is perhaps intended.⁵

Sclerophilus contortus, Norman, taken on the Norfolk coast by Mr. D. O. Drewett.⁶

To this catalogue of Ostracoda might be added not a few species, which are described as ubiquitous in Great Britain or as common throughout the East-Anglian district. Of the Cladocera, entomostracans with branched antennæ, Dr. Brady records *Moina rectirostris* (O. F. Müller) as having been taken in Norfolk by Mr. D. J. Scourfield,⁷ and this group is certainly represented in the county by species of the universally distributed *Daphnia*, of *Lynceus* and other genera, which will better be discussed when there is ample room and verge enough to trace their characters. Since Norfolk is rich in fishes, it is sure also to be rich in the parasitic Copépoda, by which fishes are beset in a striking variety of eccentric forms. Since also the county has both tracts of fresh water and a sea coast, it is sure to have a multitude of species of free-living Copepoda, though only a few seem to have been especially mentioned as occurring within its limits. Dr. Brady records three of the family Cyclopidae and two Calanidae.

Cyclops scourfieldi, Brady, from Wroxham, Filby and Rollesby broads and Heigham Sound. Mr. Scourfield has also taken it in the 'Victoria Regia Tank, Royal Botanic Gardens, Regent's Park.' Dr. Brady himself has taken it by moonlight in Coniston Lake.⁸ This species is now again identified with *C. leuckarti*, Claus, from which Dr. Brady thought it should be distinguished.

Cyclops viridis (Jurine), from the broads of Norfolk and Suffolk. This widely distributed species occurs in slightly brackish water at Lymington in Hampshire. In his Ray Society *Monograph*, Dr. Brady recorded the Norfolk form as *Cyclops gigas*, Claus, a 'giant' one-ninth

¹ *Monograph*, pt. i. p. 228; *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 33.

² *Ibid.* p. 33; *Brit. Entom.*, p. 170.

³ *Ann. Nat. Hist.*, ser. 4, vol. vi. p. 33.

⁴ *Ibid.* p. 33, compared with *Monograph*, pt. i. p. 231.

⁵ *Monograph*, pt. i. p. 237.

⁶ *Trans. Linn. Soc.*, vol. xxvi. p. 456.

⁷ *Nat. Hist. Trans. Northumberland*, vol. xiii. pt. ii. p. 245, 1898.

⁸ *Ibid.* vol. xi. pt. i. p. 75 (10), 1891.

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of an inch long, but subsequently regarded the species so named as a synonym of *viridis*.¹

Cyclops phaleratus, Koch, from Ormesby Broad. This is only one-twenty-fifth of an inch long. It 'is one of the less common British species, and likewise one of the most distinct and most easily recognized.' It is also found at the Botanic Gardens.²

Diaptomus gracilis, Sars, from Ormesby Broad.³

Eurytemora velox (Lilljeborg), 'in several of the broads of Norfolk and Suffolk.'⁴ The proper designation of this species is open to question, there being other claimants for each word of its tripartite title.⁵

Among the Phyllopoda or leaf-footed Entomostraca, there is one in which Norfolk may claim a peculiar interest. The charming 'fairy shrimp,' *Cbirocéphalus diaphanus*, Prevost, was, according to Dr. Baird, first figured and described in 1709 by Petiver, who mentions it as a native of England. Other accounts followed, by Linnæus and Schaeffer, of an animal similar but either not certainly or certainly not the same, and then the species above named was definitely assigned to a habitat in this county by Edward King, F.R.S., whose account of 'a very remarkable aquatic insect, found in a ditch of standing water, near Norwich, in the spring of the year 1762,' was published in the *Philosophical Transactions* for 1767. The impression produced on the early observers by these pleasingly pellucid and delicately tinted non-crustaceous crustaceans, with their numerous upturned, ever-moving branchial feet, is perhaps not obscurely indicated by the eulogium which King bestows on the man who found them. 'They were discovered by a poor man now dead, whose genius was very extraordinary, and much superior to what is usually found in his rank. He was indefatigable in his searches after everything curious, and, without ever having had any advantages of education, had acquired a degree of knowledge by no means contemptible.'⁶ Happily these beautiful phyllopods, if rare or rarely noticed, are still found from time to time in parts of England. It would have been pleasant to enrol among the worthies of Norfolk the poor man of uncommon genius, who watchfully studied these 'insects,' as they used to be called; but King, who so highly extols him, has left his name unrecorded.

That Norfolk, like all our other maritime counties, has several species of cirripedes, is quite certain. But apparently the actual

¹ *Nat. Hist. Trans. Northumberland*, vol. xi. pt. i. p. 82 (17).

² *Ibid.* p. 90 (25); *Ray Soc. Mon.*, vol. i. p. 117.

³ *Nat. Hist. Trans. Northumberland*, vol. xi. pt. i. p. 98 (33).

⁴ *Ibid.* p. 106 (41).

⁵ It will be noticed that here the name of the Swedish naturalist, Lilljeborg, is placed in parenthesis, whereas in the preceding line the name of the Norwegian carcinologist, G. O. Sars, is not so imprisoned. This does not imply any invidious distinction between the two eminent Scandinavian writers. It is only the conventional way of intimating that the species to which Sars gave its specific name *gracilis* still remains in the genus *Diaptomus* to which he originally assigned it, but that the necessities of classification have taken *velox* out of the genus in which Lilljeborg himself placed it, the transfer in this instance being from *Temora* to *Eurytemora*. The second of these genera, carved out of the first, was not in existence when Lilljeborg instituted the species in question.

⁶ Baird, *British Entomostraca*, p. 39, *Ray Soc.*, 1850, from *Phil. Trans.*, vol. lvii. pt. i. 1768.

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records claim only one. An excellent guide to *Hunstanton and its Neighbourhood*, by Philip Wilson, seventh edition, revised and greatly enlarged, etc., by George Webster, 1881, in the copious natural history, though it speaks of 'the crab-sea,' mentions no crab, and only one solitary crustacean. This is entered under the heading of conchology, and named 'Common Acorn-shell (*Lepas balanus*).' The account given of it is worth quoting: 'Very abundant on the large boulders of black rock scattered along the shore. The little animal inhabiting this multi-valve will afford the observer a spectacle of great interest. Let him find one of these acorn-shells on a small detached piece of rock, and keep it from moisture for an hour or so, till it becomes perfectly dry; then place it in a basin of sea water, when it will open the valves of its abode and exhibit its beautiful plume-like processes; these are the tentacula of the animal, with which it procures its food, and which it waves backwards and forwards in a most graceful manner.'¹ All this is much to the purpose for those who wish to be amused by a pleasing sight, and do not care to be troubled with scientific technicalities. But it is strange that in 1881 a writer on natural history should still be classifying the crustacean cirripedes among the Mollusca. It is equally strange that one of Charles Darwin's fellow-countrymen should at that date be placidly using such a name as *Lepas balanus* to distinguish a sessile cirripede species. As most naturalists are perfectly well aware, Darwin devoted several laborious years to the elucidation of this group, and wrote a monograph upon it in two large volumes, published by the Ray Society, one volume describing the Balanidæ, the other the Lepadidæ. The most casual glance into this standard work would have saved the situation for the *Hunstanton Guide*. The trivial name of acorn-shell unluckily has been applied to members of both families, but species of *Lepas* are easily distinguished by their leathery stalk from species of *Balanus*, which have no stalk, but are firmly seated on the rock or other basis of support. It is evidently not to a *Lepas* but to one or other of the rock-coating species of *Balanus* that the *Guide* refers. The plumose tentacula spoken of are in fact the animal's legs, their waving hairs producing an appearance of ringlets (*cirri*), from which the name of Cirripedia is derived. The more recent alternative name, Thyrostraca, or door-shells, refers to the valves, the opening and shutting of which for emission or withdrawal of the cirri is an attractive sight to every new observer.

Faunistic catalogues for areas that are not exceptional are not always highly prized by working naturalists, but the great forest of seaweed which Frank Buckland speaks of as existing off the north coast of the county might well be made the subject of special exploration. Almost certainly in skilful hands it would largely extend our knowledge of the marine crustacea of Norfolk.

¹ *Hunstanton Guide*, p. 68.

FISHES

As with the other divisions of the Norfolk fauna, the number of species of fishes which has been found in the rivers, lakes, and along the coast of Norfolk, is unusually large ; the warm shallow water in the bays and flats of the coast forming excellent breeding-grounds, and affording, in the myriads of *Entomostraca* found there, abundant food for the newly-hatched fish.

Of the total list of British fishes, *one-fifth* more are found in Norfolk than are found in any other county, comprising many very interesting species and some of great rarity.

The localities given are, in large measure, derived from :—

The Natural History of Yarmouth, by Messrs. Paget.

Sir Thomas Browne's List, written in 1666.

The late Mr. J. H. Gurney's Notes.

Lubbock's *Fauna of Norfolk*.

The *L'Estrange Household Book*.

The abbreviations used are as follows :—

P.—Paget.

J. H. G.—The late Mr. John Henry Gurney.

T. S.—Mr. T. Southwell, Norwich } from whom much valuable recent information has been derived.

A. P.—Mr. A. Patterson, Yarmouth }

These, as well as a number of other observers, have made important additions to the list. The following is a list of the fishes known to occur in the Norfolk waters¹ :—

TELEOSTEANS

ACANTHOPTERYGII

*1. Perch. *Perca fluviatilis*, Linn.

The late Mr. Gurney observed that in the Yare and Bure they are much larger near the mouths of the rivers, where the water is brackish, than higher up where this is not the case. Mr. Day confirms this view. A perch taken in Ormesby Broad, September 14th, 1866, was recorded by Mr. Gunn in the *Zoologist* as weighing $4\frac{1}{2}$ lb., and measuring 18 inches in length. Mr. Southwell mentions one of the same dimensions, taken in

the same broad in 1879, and another at Trowse Hythe, May 6th, 1880.

*2. Ruff or Pope. *Acerina cernua*, Linn.

'Has an especial Norfolk interest. It was first discovered, according to Cuvier, by an Englishman named Caius² (Dr.), who found

² John Kaye or Caius, founder of Caius College, Cambridge, and well known as the author of *The Merrie Wives of Windsor*, was born at Norwich, 1510 A.D., and was educated at the Free School. He joined Gonville College, of which he was afterwards a Fellow.

'*Aspredo fluviatilis* pisces est toto corpore asper, pinnis spinosis, percae formâ et magnitudine. Locis gaudet arenosis, et cum alibi in Britannia tum præcipue in Hiero flumine quod nostrum nordo-

¹ An asterisk (*) indicates occurrence in fresh water only, two asterisks (**) in both fresh and salt water.

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it in the Yare and called it *aspredo*, a translation of our word ruffe (rough). Caius sent the first figure of this fish to Gesner, who published it.'—Yarrell (*British Fishes*, vol. v.).

**3. Sea Bass. *Morone labrax*, Linn.

In the adult state not common, though occasionally in the Norfolk estuary. In 1869 I saw one caught by Mr. F. J. Cresswell, which weighed 10 lb.; larger ones have been caught, but Mr. Day says a fish of this size is a fine example. Sir Thomas Browne, in his list, mentions 'the basse, much resembling a flatter kind of cod.'

4. Maigre. *Sciæna aquila*, Lacép.

'A specimen taken off Sherringham in 1841 is in the Norwich Museum.'—J. H. G.

Another, 'rather over 5 feet long, and weighing 84 lb., came ashore at Thorpe, near Aldborough, August 30th, 1868.'—*Vide* Hele's *Aldborough*, p. 182.

The third Norfolk specimen of this rare fish is recorded in the *Times* of November 1st, 1875, by Mr. Tregellas of Brompton, as having been caught near Yarmouth. It was 4 feet 9 inches long, and weighed 75 lb. 'It is in the possession of Mr. Charles, Arabella Row, Pimlico.'

5. Common Sea Bream. *Pagellus centrodontus*, Delaroche.

'A fine example was taken in a draw-net off Yarmouth Beach, 1st April, 1868. This species is seldom captured.'—A. P.

Two others have been recorded in Norfolk.

vicum alluens in Baradenum estuarium at Hier (Hiermouth=Yarmouth) oppidum tunc piscatum portu celebre illabitur frequens est. Nostri Ruffum vocant, quod cum Latini asperum significat aspredinem piscem nominavimus.'—Caius: *De Rariorum Animalium*, etc., 1570.

Spenser, in his *Faerie Queene*, book iv. canto xi. stanza 33, writes:—

'Him followed *Yar*, soft washing Norwiche wall,
And with him brought a present joyfully
Of his owne fish unto their festivall
Whose like none else could show, the which they *Ruffins* call.'

And Sir Thomas Browne speaks of the *Aspreda perca minor*, and, probably, *cernua* of Carden [*sic*], commonly called a Ruff, in great plenty in Norwich, and even in the stream of that city; which, though Camden appropriates unto this city, yet they are also found in the rivers of Oxford and Cambridge.

Mr. Lubbock speaks of it as being found in large shoals in Norfolk rivers.

Paget mentions it as occurring in the rivers and broads.

According to Day (*British Fishes*), the ruffe was first noticed and figured by Belonius, p. 13.

6. Axillary Bream. *Pagellus oweni*, Günth.

The late Mr. J. H. Gurney, writing in the *Zoologist*, p. 1555, says: 'The length of this specimen, which I received from the Rev. A. Upcher yesterday, was 13 $\frac{3}{4}$ inches; in its greatest depth 4 inches; and its weight 1 lb. 5 $\frac{1}{2}$ oz. The colour, roseate and silvery, was brilliant when caught. It is preserved in the Norwich Museum.' I examined this fish at Mr. Gurney's request, and had not the slightest doubt that it was correctly named; but the late Mr. Day, apparently without having had the specimen in his hands, declares (*Fishes of Great Britain and Ireland*, vol. i. p. 41) it to be *P. erythronotus*. At my request, Mr. Southwell has re-examined it, and fully agrees that it is beyond doubt *P. oweni* (*Trans. Nat. Hist. Soc.*, 1894). Mr. Day is mistaken in supposing this to be *P. centrodontus* (*Fishes of Great Britain*, vol. i. p. 43).

7. Red Mullett. *Mullus barbatus*, Linn.; var. *surmuletus*, Linn.

Though of less frequent occurrence at the present time than it was formerly, Sir James Paget, in his *History of Yarmouth*, states that in 1831, in one week in May, 10,000 were sent to the London market. Mr. A. Patterson says: 'It is now very rare in Yarmouth; one weighing barely 2 lb. was caught amongst others.'

8. Common or Ballan Wrasse. *Labrus maculatus*, Bloch.

Yarmouth, April 15th, 1868.—Gunn.

Lynn Roads, November 14th, 1869.—E. L. King.

One, taken at Cley-next-the-Sea, on November 11th, 1893, was sent to Mr. Southwell for identification by Mr. Pashley of Cley.

9. Green Wrasse. *Labrus mixtus*, Linn.

A specimen in the Wisbeach Museum was, I am informed by Mr. Foster, the curator, captured in the Norfolk Estuary in 1850. Mr. Cresswell has once taken this fish off Hunstanton.

10. Bergylt. *Scorpaena dactyloptera*, De la Roche.

This was in error identified as *Sc. norwegica*, but Mr. Southwell has since corrected it as *Sc. dactyloptera*. It was first taken off Lowestoft, and came into Mr. Patterson's hands, by whom it was submitted to Mr. Southwell. It was 8 inches in length. A second specimen was captured at Yarmouth on April 29th, 1894. This was only 5 $\frac{1}{4}$ inches long.—*The Zoologist*, 1894, p. 430.

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- *11. Miller's Thumb or Noggle-head. *Cottus gobio*, Linn.

Upper Yare, Wensum.

'A water-rail was picked up near the Yare, and a little grebe in the Wensum, both choked in endeavouring to swallow a fish of this species.'—*J. H. G.*

12. Father-lasher or Bull-head. *Cottus scorpius*, Linn.

'Mr. Patterson has obtained several very beautiful specimens of the variety named *C. grælandicus* at Yarmouth, one of which is in the Norwich Museum. I have seen others from Cley and Wells.'—*T. S.*

13. Bubalis. *Cottus bubalis*, Euphr.

'The first recorded capture of this species made April 7th, 1891, at Yarmouth.'—*A. P.* (*Trans. Norf. and Nor. Nat. Soc.*, vol. v. p. 324).

Cromer.—*J. H. G.*

I had previously found it in the Norfolk Estuary, and it is in Sir Thomas Browne's list.

14. Grey Gurnard. *Trigla gurnardus*, Linn. Yarmouth.—*Paget.*

15. Red Gurnard. *Trigla cuculus*, Linn. Norfolk Estuary.—*R. Elwes.* Yarmouth.—*Paget.*

Sir T. Browne speaks of *Gornart cuculus* as a Norfolk species.

16. Tubfish or Sapphirine Gurnard. *Trigla birundo*, Bloch.

Norfolk Estuary.—*E. L. King, Mr. Cresswell; T. Pæcileptera.*

Norfolk Estuary.—*J. L.*

17. Streaked Gurnard. *Trigla lineata*, Linn. Yarmouth, November, 1895.—*A. P.*

Two others have been taken at Lowestoft.

18. Dogge. *Agonus cataphractus*, Linn. Norfolk Estuary.

Sir Thomas Browne evidently describes this species: 'A little corticated fish about 3 or 4 inches long, answering that which is named *Piscis octangularis* by Schönevaldus.' 'Octagonius versus caput, versus caudam hexagonius.'

19. Lump-sucker. *Cyclopterus lumpus*, Linn.

I have seen five or six large ones taken in the Norfolk Estuary within the last ten years. *Paget* mentions 'one taken in the river' at Yarmouth, in 1819.

'One in the Norwich Museum taken off Yarmouth, January, 1848, weighed 13½ lb.'—*J. H. G.*

Sir Thomas Browne, says this fish is 'esteemed by some a festival fish, though it

affordeth but a glutinous jelly, and the skin is beset with stony knots after no certain order.'

A fine specimen was brought alive to me at Lynn, December 11th, 1884. It weighed 17 lb. 'One weighing 26 lb. taken at Yarmouth, February 24th, 1897.'—*A. P.* (*Trans. Norf. and Nor. Nat. Soc.*, vol. vi. p. 3).

20. Sea Snail. *Liparis vulgaris*, Flem.

Norfolk Estuary: not common. Cromer.—*J. H. G.*

21. Montagu's Sucker. *Liparis montagui*, Donov.

I have frequently taken this fish, which is much more common than the preceding, in the Norfolk Estuary, and several times in the river opposite Lynn, in fresh water at low tide. Colonel Montagu, after whom this species is named, says it 'inhabits only the rocky parts of the coast, and of course is rarely taken with the dredge' (*Yarrell*, vol. ii. p. 375).

22. Spotted Goby. *Gobius minutus*, Gmel.

Norfolk Estuary. Northrepps.—*J. H. G.*, September 2nd, 1874.

23. Two-spotted Goby. *Gobius ruthensparri*, Euphr.; *Gobius pusillus*, J. Lowe.

Mr. Day (*Fishes of Great Britain and Ireland*, p. 161) considers these two as the same species: but there are, I think, well-marked differences. *G. pusillus* was first found by me near Lynn in 1880 (D. 6-10, A. 10, V. 10). Length 1½ inches; head rather higher than broad; dorsal fins closely approximate—as high as body. Body transparent, covered with dark spots, which are larger and square-shaped along lateral line; anal and second dorsal fins equal and opposite; third ray of first dorsal longest; all the fins transparent, without dots; end of tail square.

When transferred to the aquarium from the pool in which they were discovered these fish lived for a long time in quite fresh water, to which they had been gradually accustomed, but when suddenly placed in cold fresh water they were apparently asphyxiated, all the fins becoming rigidly expanded. They took food readily from the hand, and would attach themselves to the sides of the glass in any position by means of the ventral fin.

24. Rock Goby. *Gobius niger*, Linn.

The late Mr. F. J. Cresswell informed me that he had taken a specimen of this fish at Hunstanton, June 13th, 1876. He compared it carefully with Couch's figure, and

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had not the least doubt of its being this species. This is the first instance of its occurrence on the Norfolk coast.

Mr. A. Patterson mentions the capture of three specimens, at Yarmouth, in shrimp nets (*Trans. Norf. and Nor. Nat. Soc.*, vol. v. p. 228).

25. Transparent Goby. *Aphia pellucida*, Nardo.

On June 9th, 1890, a specimen of this fish, which is new to Norfolk, was brought to Mr. A. Patterson. Several others were afterwards found. The species was determined by Dr. Günther (*Trans. Norf. and Nor. Nat. Soc.*, vol. v. p. 228).

26. John Dory. *Zeus faber*, Linn.

'Hitherto considered rare, but this summer (1834) several have been caught on the Knowl by the turbot-fishers.'—*Paget*.

'Occasionally, but not frequently, sent from Yarmouth to the Norwich market.'—*J. H. G.*

'One, 2 feet long, $8\frac{1}{2}$ lb., taken amongst herrings at Yarmouth, contained seven herrings.'—*A. P.* (*Trans. Norf. and Nor. Nat. Soc.*, vol. vi. p. 3).

'One taken in a lobster-pot off Sherringham, October 1st, 1881.'—*T. S.*

27. Boar-fish. *Capros aper*, Linn.

Has not been previously recorded as occurring in Norfolk. Mr. A. Patterson of Yarmouth (July 9th, 1881) found a specimen on a shrimper's board. It had been caught the same morning; it measured 5 inches in length, and was of a lovely carmine colour. Mr. Southwell informs me that a second specimen was found dead on Yarmouth beach, May 1st, 1882. The boar-fish was first recorded as having been taken off the British coast in 1825. It was regarded as so great a rarity that one found on the beach at Brighton in 1842 was considered worthy of presentation to Her Majesty the Queen. H.R.H. the Prince Consort was the first who correctly identified the fish as *Capros aper*. Since that time it has occurred, in some numbers, on the south coast, scarcely a year passing without its being met with. In 1877 it was taken in great numbers on the south coast, and one was found as far north as Grimsby. In 1879 it was again numerous on the south and east coasts, where it is met with every year, occasionally in large quantities.

28. Scad, Horse-mackerel. *Caranx trachurus*, Linn.

One which I saw taken in the Norfolk Estuary weighed 2 lb. *Paget* says that at

Yarmouth 'it is rarely caught, and those that are taken are generally small.'

'Fifteen inches long; very common.'—*A. Patterson*.

'Before the herrings,' says Sir T. Browne, 'there commonly cometh a fish about a foot long, by fishermen called a *horse*, resembling in all points the *Trachurus* of Rondeletius.'

Mr. H. M. Upcher tells me he has seen large numbers of the scad in chase of small fry along the coast at Sherringham, and so intent in the pursuit as to be easily taken with a landing-net. The beach was quite covered with small fish which were stranded on the shingle after leaping from the water to escape their pursuers.

29. Mackerel. *Scomber scombrus*, Linn.

Yarmouth: 'Abundant.'—*P.*

'Sometimes they are of a very large size; and one taken this year (1668), which was by measure an ell long, and of the length of a good salmon, at Lowestoft.'—*Sir Thomas Browne*.

Mr. Couch says the largest he ever saw measured half an inch over 2 feet.

Mr. R. D. Massingham, harbour-master of Lowestoft, in a letter to Mr. Southwell, November 9th, 1875, comments on the unusual fact of a large number of mackerel having been taken at that late season of the year. He says: 'The large quantity of mackerel landed at our market this autumn is a very unusual thing, as they are only, as a rule, caught on this coast in May and June.'

'No less than 3 lasts were brought in by one fishing-boat, October 20th, 1898.'—*T. S.*

Mr. A. Patterson has recorded the following varieties of this species: var. *punctatus*, *scriptus*, *concolor*.

30. Plain Bonito. *Auxis rochei*, Risso.

'Two which were taken in June, 1839, off Yarmouth, and came into Mr. Yarrell's possession' (*British Fishes*, vol. i. p. 160).

'A third, also taken off Yarmouth, July, 1847, is now in the museum of the Cambridge Philosophical Society.'—*T. E. Gunn*.

31. Tunny. *Orcynus thynnus*, Linn.

Mr. Gurney writes: 'An immature specimen taken off the Suffolk coast, near Southwold, I believe, is preserved in the Norwich Museum.'

'Small specimens not unfrequently taken during the mackerel fishery.'—*Paget*.

T. E. Gunn mentions one taken at Yarmouth, October 6th, 1870, 6 feet 9 inches in length, 4 feet 4 inches in girth, weight 224 lb.

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Mr. Southwell writes, November 29th, 1876: 'A fine tunny was cast ashore at Bacton on the 24th inst. It was in an exhausted state, but not dead. Yesterday I saw it in Norwich. It is a beautiful fish, measuring 9 feet 4 inches in length' (*Zoologist*, 1877).

32. Blackfish. *Centrolophus pompilus*, Linn.

'A living specimen was found cast up on the beach at Sea Palling, after the severe north-east gales, about March 27th, 1898; seen by me shortly after.'—*T. S.*

33. Ray's Bream. *Brama raii*, Bl.

'Generally found left by the tide after heavy weather.'—*T. S.*¹

Mr. L'Estrange records one which was picked up off Hunstanton on October 12th, 1892. It weighed 5 lb. 14 oz., and measured 23½ inches. Another specimen was found by Mr. Patterson near Yarmouth, November 23rd, 1894, of about the same length; and a third on October 29th, 1895.

34. Opah. *Lampris luna*, Linn.

'A magnificent specimen found on the breakers (Yarmouth), November, 1828; another, December 24th, 1823.'—*Paget*.

Couch mentions another which was caught on the Norfolk coast, near Hunstanton, in 1839 (*British Fishes*, vol. ii. p. 134). This is most probably the same which is now in the Wisbeach Museum.

'A specimen obtained at Eccles, July 6th, 1844, is in the Norwich Museum; weight, 4 or 5 stone.'—*J. H. G.* (*Zoologist*, p. 679).

'One taken at Yarmouth, October 17th, 1891; length 38 inches; weight, 51 lb.'—*A. P.* (*Trans. Norf. and Nor. Nat. Soc.*, vol. v. p. 325).

'The *Norfolk Remembrancer*, under date April 30th, 1810, p. 113, says: "A very rare and curious fish called the opah, or king fish, found on Mundesley beach!"'—*T. S.*

35. Swordfish. *Xiphias gladius*, Linn.

In August, 1865, a specimen measuring from tip to tip 10 feet 2 inches was brought to me by some Lynn fishermen, who had found it stranded about four miles below Lynn. There was no wound to account for its death, and it had evidently been left by the receding tide.² My friend, Professor

Cobbold, who examined it with me, discovered in it several species of Entozoa new to science. In the stomach there were, besides some small fish, the remains of a crab and starfishes. Sir T. Browne mentions one with a sword a yard and a half long, taken by being entangled with herring-nets at Yarmouth.

'On October 31st, 1861, a specimen 9 feet 6 inches, including the sword, which measured 3 feet, was observed in shallow water at Mundesley, and captured by a noose being passed over its tail. The head is in the Norwich Museum. I tasted its flesh and found it very palatable.'—*J. H. G.*

The sword of one found in the Wash is now in the Wisbeach Museum.

'A swordfish, taken at Hunstanton in 1861, is now preserved in the collection at Hunstanton Hall.'—*T. S.*

In the *Lynn Advertiser*, July 18th, 1879, there is a notice of one caught in a mackerel net at Sherringham by Matthew Scotter. It measured 9 feet 6 inches. Mr. Southwell mentions another of the same size, which was stranded on the beach at Palling, October 30th, 1881; one was taken off Wolferton Creek, October 30th, 1883, which measured 5 feet 3 inches, and the sword 3 feet 2 inches; and one at Burnham Overy, November 13th, 1882, which measured 10 feet long and weighed 400 lb.

36. Deal-fish. *Trachypterus arcticus*, Bränn.

The first Norfolk specimen of this rare and singular fish was seen at Cole's, naturalist, Norwich, by Mr. Southwell, from whom I received the following note of its capture: 'It was taken in a drift-net by the *Butterfly*, Wells, W. J. Hardman, October 8th, 1879. It measures 53 inches long, 10 inches deep; thickness about 1 inch. After being purchased by Mr. T. J. Mann, of Bishop's Stortford, and exhibited at the Norwich Fisheries Exhibition, it was presented by that gentleman to the Norwich Museum, where it now is.' Mr. Southwell's interesting account of this fish is published in the *Transactions of the Norfolk and Norwich Naturalists' Society*.

37. Greater Weever. *Trachinus draco*, Linn.

Norfolk Estuary.—*R. E.*

Yarmouth.—*Paget*.

Occasionally on the Norfolk coast.—*J. H. G.*

¹ 'Mr. Gurney mentions one taken at Yarmouth, and the Rev. E. Dowell another taken at the same place.'—*Zoologist*, 1851, p. 3,058.

² Swordfish: 'No. 52. *Tetrarhynchus* (larva); 53. *Distoma clavatum*; 54. *Ascaris incurva*. These

parasites were obtained at Lynn by Dr. John Lowe and myself when dissecting a *Xiphias gladius* captured off the Norfolk coast in 1865.'—*The late Prof. T. S. Cobbold* (International Fisheries Exhibition).

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38. Common Weever. *Trachinus vipera*, Cuv. & Val.

In Sir T. Browne's list this species rather than the preceding is referred to: 'A sting-fish, wiver, or kind of ophthidion, about 4 inches long, with a sharp, small, prickly fin along the back, which often venomously pricketh the hands of fishermen.'

39. Dragonet or Dusky Skulpin. *Callionymus lyra*, Linn.

Norfolk Estuary: common.

Yarmouth: 'very rare.'—*P.*

The dusky skulpin is now proved to be the female or immature male of this species. In the estuary the adult male is comparatively rare, and the colours seldom bright as in other localities where the water is clearer. The amount of alluvial matter held in suspension would seem to prevent the colouring action of the light.

40. Two-spotted Sucker. *Lepadogaster bimaculatus*, Penn.

For the only record of this being taken on the Norfolk coast I am indebted to the Rev. E. W. Dowell, who caught one at Blakeney, in July, 1846.

41. Angler. *Lophius piscatorius*, Linn.

Common on our coast.

One brought into Yarmouth June 3rd, 1897, weighed 1 cwt.—*A. P.*

'The *Rana piscatrix*, or frog-fish, is sometimes found in large magnitude.'—*Sir T. Browne*.

42. Wolf-fish. *Anarrhichas lupus*, Linn.

Yarmouth.—*P.*

Mr. Gurney writes: 'I have seen a few taken off the East Norfolk coast, one is in the Norwich Museum.' 'One measuring 36½ inches long was washed up on Cromer beach, August 6th, 1874.'—*J. H. G.*

Sir T. Browne makes mention of the 'sea wolf, or *Lupus nostras* of Schöneveldus, remarkable for its spotted skin and notable teeth.'

One in the Wisbeach Museum was taken in the Norfolk Estuary.

43. Gattorugine. *Blennius gattorugine*, Bloch.

'On May 25th, 1897, Mr. Patterson sent me a specimen of this fish, which was taken on the 21st in a shrimp-net off Yarmouth.'—*T. S.* He records a second specimen May 21st, 1900.

This, the largest of the British blennies, has not been met with previously in Norfolk. It is therefore an important addition to the fauna of Norfolk,

44. Shannay. *Blennius pholis*, Linn.

Cromer: 'among stones at low tide.'—*J. H. G.*

45. Butterfish. *Centronotus gunnellus*, Linn.

Norfolk Estuary: common.

Yarmouth.—*P.* Cromer.—*J. H. G.*

46. Viviparous Blenny. *Zoarces viviparus*, Linn.

Norfolk Estuary. Yarmouth.—*P.*

Mr. Gurney says: 'Adult specimens are found near the beach, Lowestoft, and in the later summer months young ones, about an inch in length, are abundant in the upper part of the inner harbour at Lowestoft, where they frequent the weed banks and, I think, burrow in them.'

ANACANTHINI

47. Cod. *Gadus morrhua*, Linn.

'It used to be thought that the finest cod supplied to the Norwich fish-market were those sent up from Sherringham, which were usually found to have been feeding on crabs.'—*J. H. G.*

Mr. Day, in his work on 'British Fishes,' has a curious note on what might be considered a Norfolk example of this species. 'The contents of their stomach are almost infinite (*sic*)—from one, captured in Lynn Deep, one Midsummer eve, 1626, and brought to the vice-chancellor of Cambridge, was taken a book in three treatises' (vol. i. p. 279).

48. Haddock. *Gadus aeglefinus*, Linn.

Norfolk Estuary: common. Yarmouth.—*P.*

In Sir T. Browne's list: '*Ascellus minor Schöneveldi* (*Callarius plinii*) or haddocks.'

49. Bib or Pont. *Gadus luscus*, Linn.

Norfolk Estuary. Yarmouth.—*Patterson*.

50. Power or Poor Cod. *Gadus minutus*, Linn.

Mr. Patterson sends me a note of an example, 4 inches long, taken in a shrimp-net off Yarmouth, February 12th, 1893. He recorded the first Norfolk specimen, which he found at Yarmouth, April 6th, 1890, in the *Transactions* of that year (vol. v. p. 228). One, 10 inches in length, October 12th, 1894; another, November, 1894; and one, March 16th, 1897, 7½ inches.—*A. P.* (*Trans. Nat. Hist. Soc.*, vol. vi. p. 3).

Since its first detection in 1890 specimens have been occasionally taken by longshore and shrimp-netters, from 7 to 10 inches in length.

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'A small one, in draw-net, May 9th, 1898.'
—A. P.

51. Coal-fish. *Gadus virens*, Linn.

Yarmouth: 'plentiful.'—P. '*Ascellus niger, carbonarius*, or coal-fish.'—Sir T. Browne.

A large one, caught in the Norfolk Estuary, in 1845, is in the Wisbeach Museum.

The Rev. B. W. Dowell has frequently taken them with the line in Blakeney Harbour.

52. Whiting. *Gadus merlangus*, Linn.

Norfolk Estuary: plentiful. Yarmouth.—P.

'The whiting on the coasts of Norfolk and Suffolk, only attain about two-thirds the size of those on the Devonshire coast.'—J. H. G.

'*Ascellus albus*, or whittings, in great plenty.'—Sir T. Browne.

'Yarmouth, March 29th, 1891; the largest on record. It weighed 7½ lb.'—A. P.

53. Pollack. *Gadus pollachius*, Linn.

'Numbers of this species at Yarmouth every spring. They take a bait freely, and are locally known as "Pinnikin Coles."'—A. P.

This fish has not been previously recorded in Norfolk. Large ones are rarely taken by cod-liners (*Trans. Nat. Hist. Soc.*, vol. v. p. 229).

54. Hake. *Merluccius vulgaris*, Cuv.

'In February, 1847, a hake, about 30 inches long, was caught off Sherringham.'—J. H. G.

55. Ling. *Molva vulgaris*, Flem.

Norfolk Estuary: common, but not of large size. Yarmouth.—P.

In the *L'Estrange Household Book* frequent mention is made of this species, e.g. 2 Hen. VIII. 1519: 'Item.—Pd. for halfe a hundred Lynge x^d. Item.—For carryinge of ye same Lynge fr. ye Bulle to ye comon Stathe, iiij^d.'

*56. Burbolt. *Lota vulgaris*, Cuv.

Yare, Bure and Waveney.

'It penetrates almost to the sources of the rivers. I have known many caught, and some two or three pounds in weight, from the small streams which unite to form the Thet.'—Lubbock's *Fauna of Norfolk*.

'One in Norwich Museum taken near Shropham.'—J. H. G.

Sir T. Browne mentions it: 'To be had in the Norwich river, and between it and Yarmouth, as also in the rivers of Marshland.'

Mr. Norman, of Yarmouth, caught one 2 lb. 2 oz. in weight, near Berney Arms Cement Works.

57. Five-bearded Rockling. *Motella mustela*, Linn.

'Norfolk Estuary, two, August, 1870; September, 1871.'—Dr. Plowright.

Yarmouth.—P.

'A very small specimen taken December 17th, 1821.' 'Abundant at Cromer among stones at low water.'—J. H. G.

58. Three-bearded Rockling. *Motella tricirrata*, Bloch.

Norfolk Estuary.—Dr. Plowright.

Sherringham.—J. H. G.

One at Northrepps, December 24th, 1833.—Miss Gurney's Diary.

Yarmouth.—A. P. (*Trans. Nat. Hist. Soc.*, 1890-91).

59. Four-bearded Rockling. *Motella cimbria*, Linn.

'A specimen of this species, which is new to the Norfolk fauna, was found among the refuse of draw-nets, on Yarmouth beach, May 23rd, 1889.'—A. P. Subsequent specimens were verified by Mr. Southwell (*Trans. Nat. Hist. Soc.*, vol. v. p. 229).

60. Lesser Fork-beard. *Raniceps raninus*, Linn.

Norfolk Estuary.—Dr. Plowright.

Sherringham, January 29th, 1846.—Rev. E. W. Dowell (*Zoologist*, 1864).

'One of the rarest British species.'—Yarrell, vol. ii. p. 293.

Yarmouth: two, 1891.—A. P. (*Trans. Nat. Hist. Soc.*, vol. v. p. 234).

'Two taken off Cromer, December, 1836.'—Miss Gurney's Diary (*Trans. Nat. Hist. Soc.*, vol. ii. p. 21).

61. Holibut. *Hippoglossus vulgaris*, Flem.

Norfolk Estuary. Yarmouth.—P.

'The Norwich papers of February 15th, 1873, record the exhibition in Norwich fish market of a holibut taken off Yarmouth. It measured 5 feet 4 inches long, 2 feet 6 inches broad, 9 inches thick, and weighed 7½ st.'—J. H. G.

62. Long Rough Dab. *Hippoglossoides limandoides*, Bloch.

'A fine specimen, 16 inches long, was obtained from a Yarmouth fishmonger. It was taken off the Norfolk coast, January 18th, 1891.'—A. P. (*Trans. Nat. Hist. Soc.*, vol. v. p. 229). It is new to the Norfolk fauna.

'It is not unfrequently seen in the fish markets.'

'One 8½ inches at Yarmouth, March 16th, 1897.'—A. P. (*Trans. Nat. Hist. Soc.*, vol. vi. p. 3).

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63. Turbot. *Rhombus maximus*, Linn.

Norfolk Estuary. Yarmouth.—P.

This and the following species are mentioned by Sir T. Browne: 'The great rhombus or turbot, *aculeatus et levis*.'

In the *L'Estrange Household Book*, A.D. 1519: 'Item.—A fresh turbutt, ij^s. iiij^d.'

'One with white under face, notched in the usual place. The travelling eye in the notch opened both sides. Saw it May 24th, 1898.'—A. P.

64. Brill. *Rhombus lævis*, Linn.

Norfolk Estuary: common. Yarmouth.—P.

L'Estrange Household Book: 'Item.—Paid to John Syft for a brattcocke, viij^d.' Sir T. Browne refers to this in the following distich (M. S. Sloan, 1784) with the explanatory note:—

'Of wry-mouthed fish! give me the left side black,¹

Except the sole,² which hath the noblest smack.'

Mr. Gurney informs me that 'from thirty to forty years ago a flat fish was commonly caught about Wells, which was locally called a "bradcock"; but I have not been able to ascertain its scientific name.'

The term is still used here with reference to the brill.

'February 13th, 1892, a perfect albino of this species was brought into Yarmouth. Both sides were white, the extreme edge of the fins merging into yellowish grey. Length, 15 inches.'—A. P. (*Trans. Nat. Hist. Soc.*, vol. v. p. 326).

65. Common Topknot. *Zeugopterus punctatus*, Bloch.

'A specimen, 7½ inches in length, by 4½ inches in width, was brought by a shrimper, June 11th, 1890. This, the first observed Norfolk specimen, is now in the Norwich Museum.'—A. P. (*Trans. Nat. Hist. Soc.*, vol. v. p. 229).

'Another specimen, the second, 6½ inches long, and 3¼ inches wide, was taken off Smith's Knowle, March 4th, 1894. One, on January 20th, 1896; two, January 17th; and five, February 3rd, 1898.'—A. P.

66. Sail Fluke, Megrim. *Lepidorhombus megastoma*, Donovan.

Norfolk Estuary, June 18th, 1875.—R. Ekwes, Esq.

This is the only specimen which I have

¹ As turbot, bret, brectcock, skulls.

² Which is black on the right side, as also butts, sandaps, and flounders.

seen. It is hitherto unrecorded as a Norfolk species.

'A small specimen, about 5 inches long, was taken in the shrimp-nets at Yarmouth, May 3rd, 1893.'—A. P. This is the second recorded in Norfolk.

67. Plaice. *Pleuronectes platessa*, Linn.

Common.

Although not an extremely large fish, one, of which Mr. A. Patterson sends me a note, is worth recording. It weighed 10 lb. 12 oz., and was taken at Yarmouth, November 7th, 1892.

'Item.—Paid for x plaices, iiij^d.'—*L'Estrange Household Book*. Abnormality (*Trans. Nat. Hist. Soc.*, 1898, p. 408) worthy of mention.'—A. P.

68. Smear Dab, Lemon Dab. *Pleuronectes microcephalus*, Donovan.

Norfolk Estuary.

69. Pole or Craig Fluke. *Pleuronectes cynoglossus*, Linn.

On February 11th, 1892, Mr. A. Patterson met with a specimen of this fish, which he forwarded to Dr. Günther, who confirmed its identity. It measured 18 inches in length. Two others, which measured 8 and 10 inches, were sold on March 14th, 1892 (*Trans. Nat. Hist. Soc.*, vol. v. p. 324).

Not previously recorded as a Norfolk fish.

Two examples at Yarmouth: April 3rd, 1895, January 20th, 1896. The former in Cambridge Museum.—A. P.

This fish, locally known as the 'witch,' is not unfrequently seen in the Yarmouth Fish Wharf.

70. Dab. *Pleuronectes limanda*, Linn.

**71. Flounder. *Pleuronectes flesus*, Linn.

Norfolk Estuary: common. Yarmouth.—P.

Breydon, May 6th, 1893. 19½ inches and 17½ inches, by 10½ inches; weight, 3 lb. 4 oz. Another, 22 inches by 13¾ inches, November, 1892.—A. P.

'Small flounders occur in the Yare, as high up as the New Mills at Norwich, which is the first stoppage in the river to fish ascending from the sea.'—J. H. G.

I have frequently seen specimens caught in the Ouse, which were affected with a peculiar skin disease resembling epithelioma—large fungous growths cropping out all over the body. The granulations large and roe-like—under microscope consisting of large nucleated cells.

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72. Sole. *Solea vulgaris*, Quens.

Norfolk Estuary: common. Yarmouth.
—P.

Mr. Gurney thinks that 'the sole, like the whiting, attains only about two-thirds the size on the coasts of Norfolk and Suffolk that it does on the Devonshire coast.'

Very large specimens are, however, occasionally taken in Lynn Deep.

73. Lemon Sole, or French Sole. *Solea lascaris*, Risso.

Several examples of this fish, caught in the Norfolk Estuary, have been sent to me by Mr. John Devonshire, Lynn.

Mr. A. Patterson sends me a note of the capture of this fish at Yarmouth. It had been previously reported only from the Norfolk Estuary.

'Another specimen, January 21st, 1897.'
—A. P.

PLECTOGNATHI

74. Sun-fish. *Orthogoriscus mola*, Linn.

Lynn: Two, November, 1850; October, 1863. Mr. E. L. King. Yarmouth.—P.

'One taken November, 1821. Salthouse, November, 1850.'—*Rev. E. W. Dowell*.

'The Norwich Museum contains one taken off Overstrand in 1843.'—*J. H. G.*

Sir T. Browne says: 'Sometimes we meet with a *mola*, or moon-fish, so called from some resemblance it hath to a crescent in the extreme part of the body, from one fin unto another. One being taken near the shore at Yarmouth, before break of day, seemed to grunt and shiver like a hog. . . . The gills of these fish we found beset with a kind of sea-louse.¹ In the year 1667 a *mola* was taken at Mousley which weighed 200 lb.'

Mr. Southwell saw one at Lynn, November 15th, 1850. Its dimensions were 4 feet long, 2 feet deep, and about 15 inches thick. Another, at Thornham Hall, which was 4 feet 3 inches from nose to tail; 6 feet in depth across the fins, which were each 2 feet in length; weighed 210 lb.; is recorded in the *Field*, January 7th, 1865. One in the Wisbeach Museum was taken at Yarmouth in 1835.

Miss Gurney records one found on Overstrand beach, November 13th, 1836 (*Trans. Nat. Hist. Soc.*, vol. ii. p. 21).

'A small sun-fish, weighing 2 stone, which had been captured at Lynn, was taken to Mr. Lowne, of Yarmouth, on September

2nd, 1887; and Mr. Pashley, of Cley, informs me that on November 11th, 1893, a much larger one, 5 feet 5 inches in length and weighing 16 stone, was brought to him, which had been taken that day on the beach at Cley-next-the-Sea.'—*T. S.*

One taken off Yarmouth, September 12th, 1896, was 18 inches long, weighed 10 lb.—*A. P.*

75. Oblong Sun-fish. *Orthogoriscus truncatus*, Retz.

'One taken in a "dydle" (a sort of landing-net) over the side of the trawler *Result*.'—*A. P.* (No date or place given.)

PERCESOCES

**76. Grey Mullet. *Mugil capito*, Cuv.

Norfolk Estuary: common. Yarmouth.
—P.

'About 1880, a lot of unusually large grey mullet were sent to the Norwich market from Blakeney.'—*J. H. G.*

**77. Lesser Grey Mullet. *Mugil chelo*, Cuv.

Norfolk Estuary.—*F. J. Cresswell, Esq.*

A small specimen of this fish, taken on Breydon, was sent by Mr. A. Patterson to Mr. Southwell, who ascertained its identity (*Trans. Nat. Hist. Soc.*, 1890-91).

78. Atherine. *Atherina presbyter*, Jen.

Lowestoft.—*J. H. G.*

'As a rule rare at Yarmouth, one now and again turning up in the smelt-nets.'—*A. P.*

May 4th, 1891. Yarmouth.—*A. P.* (*Trans. Norf. and Nor. Nat. Soc.*, 1891-92).

Norfolk Estuary: frequent in the summer months.

There can be no doubt it is plentiful in summer along some parts of the east coast, contrary to the expressed opinion of Montagu and Yarrell as to its absence.

79. Larger Launce or Sand-Eel. *Ammodytes lanceolatus*, Lesauv.

Norfolk Estuary.

80. Lesser Launce. *Ammodytes tobianus*, Linn.

Norfolk Estuary: common. Yarmouth.
—P.

Common.—*J. H. G.*

Sir T. Browne observes: 'The sand eels (*Anglones* of Aldrovandus, or *Tobianus* of Schönevaldus), commonly called *smoulds*, taken out of the sea-sands with forks and rakes, about

¹ *Lepeoptheirus nordmannii*.

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Blakeney and Burnham; a small, round, slender fish, about three or four inches long, as big as a small tobacco-pipe; a very dainty dish.'

81. Garfish. *Belone vulgaris*, Flem.

Lynn Roads.—Mr. E. L. King.

Lubbock says this has been taken within five miles of Norwich.

'The *acus major*, called by some garfish and greenback, answering the figure of Rondeletius, under the name of *acus prima species*, remarkable for its quadrangular figure and verdigris-green bone.'—Sir T. Browne.

In the editor's footnote this is incorrectly given as *Centriscus scolopax*, a Mediterranean fish, not likely to be caught on the Norfolk coasts.

82. Skipper. *Scombrosox saurus*, Walb.

Yarmouth.—J. H. G.

'Two specimens, about 16 inches long, caught October 25th, 1844, are now in the Norwich Museum.'

Blakeney Harbour, December 7th, 1846. —Rev. E. W. Dowell.

Sir T. Browne remarks: 'The *saurus* we sometimes meet with young. Rondeletius confesseth it a very rare fish, somewhat resembling the *acus* or needle-fish before, and mackerel behind.'

HEMIBRANCHII

**83. Three-spined Stickleback. *Gastrosteus aculeatus*, Linn.

In the Ouse immense quantities of this species are often caught and sold for manure, or used as bait for eel. Mr. Gurney states that in the saltmarshes at Cley and Salthouse, where they are very numerous, they appear to form the chief food of the little tern during the nesting season.

**84. Ten-spined Stickleback. *Gastrosteus pungitius*, Linn.

In ditches near Lynn; it is not very common. The number of species vary.

'Three were sent me by the Rev. W. Millard from a ditch near Shimbling.'—T. S.

'Mr. F. Norgate writes: February 23rd, 1883: "Is abundant in meadow drains at Sparham." Mr. Louis Buxton also found it not uncommon in his lake at Bolwick Hall, 1881.'—T. S. In west Norfolk it is not very common.

85. Fifteen-spined Stickleback. *Gastrosteus spinachia*, Linn.

Yarmouth: 'rather rare.'—P.

Mr. Gurney saw one taken from the stomach of a cod-fish purchased in Norwich market.

Yarmouth: 'frequent,' 1897.

LOPHOBRANCHII

86. Broad-nosed Pipe-fish. *Siphonostoma tybble*, Linn.

Norfolk Estuary. One which was taken at Heacham is in the Norwich Museum. Yarmouth.—P.

87. Greater Pipe-fish. *Syngnathus acus*, Linn. Common.

The following note is worth recording in reference to this species which abounds in the Norfolk Estuary: 'Acus item apud nos non vulgaris pisces est, nici circa phanum Botolphi quod nostri *Boston*, quasi *Botolphis toune* diceret . . . Hornbeke nostri dicunt a corneo quod habet rostro' (Dr. Caius *De Canibus Britannicis*, fol. 26, 1570).

88. Snake Pipe-fish. *Nerophis æqueus*, Linn.

Mr. Elwes has taken this in the Norfolk Estuary. Mr. A. Patterson found one washed up on the beach at Yarmouth, the first taken in that locality (*Trans. Nat. Hist. Soc.*, vol. v. p. 230).

89. Straight-nosed Pipe-fish. *Nerophis ophidion*, Linn.

Norfolk Estuary, June 12th, 1871. Mr. E. L. King.

90. Sea-horse. *Hippocampus antiquorum*, Leach.

Yarmouth. This is given in Messrs. Paget's list, but there is no other record of its having been taken on the Norfolk coast.

HAPLOMI

*91. Pike. *Esox lucius*, Linn.

'Attains a large size in the Norfolk Broads, from 25 to 35 lb.'—Lubbock.

Mr. R. R. B. Norman mentions (in *Land and Water*, 1873) one taken in the broads near Yarmouth, which weighed 36½ lb. and was 54 inches long; it was caught with a trimmer. Two pike, caught on February 17th, 1880, in two different localities in Norfolk, both with rod and line, measured respectively 47 and 46 inches in length. The former weighed 36 lb. and the latter 30½ lb.; they were both full females. Mr. Gunn says that he has never met with a male pike weighing more than 20 lb.

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92. Pearlsides. *Maurolicus borealis*, Nilss.

Mr. Southwell thinks that 'Pearlsides,' given by Mr. Yarrell, is preferable to Argentine as a trivial name for this fish, as the latter is apt to create confusion with the Hebridal smelt, *Argentina sphryæna*.

A specimen of this lovely fish was found in some draw-net refuse on Yarmouth beach, on April 1st, 1889, by Mr. A. Patterson.

Three others were found under similar circumstances near the Britannia Pier, by Mr. J. B. Beckett, of Yarmouth, on February 24th, 1890.

'Another freshly dead specimen was picked up on Scratby beach by Mr. W. Tomkins, in March, 1893; it was $1\frac{1}{2}$ inches long.'—*A. P.*

OSTARIOPHYSI

*93. Carp. *Cyprinus carpio*, Linn.

A large one was taken in the Kettle Mills pond, Lynn, in 1865. Mr. Lubbock says: 'It is not common upon the whole of the broads, but where it does occur, grows to the very largest size; the dimensions of one lately taken are as follows: length $29\frac{1}{4}$ inches, girth 29 inches, weight $15\frac{1}{2}$ lb.'

'Nearly forty years since a carp of about 12 lb. weight was found alive and healthy in a drain communicating with the river Wensum, near the site of the old Blackfriars Monastery at Norwich. With this exception, I never knew a carp taken in the Norwich river.'—*J. H. G.*

Sir T. Browne says: 'Two of the largest I ever beheld were taken in the Norwich river.'

*94. Crucian Carp. *Cyprinus carassius*, Linn.

'A solitary specimen has been twice observed in the Yare' (*Fauna of Norfolk*).

Mr. Gurney informs me that it is common in ponds in East Norfolk, and he says: 'It is well known to hybridize freely with the common carp. Some years since some hybrids of this description, bred at Hempstead, near Holt, were identified as such by Dr. Günther, to whom I sent them for examination. At Hempstead the true carp generally attains 8 lb. in weight, and the hybrid about half that weight. The largest specimen of *Cyprinus carassius* of which I have note weighed only 1 lb. 7 oz.'

The variety known as gold-fish (*Cyprinus auratus*) is said by Mr. Gunn to 'breed at several mill-pools in Norfolk,' but he gives no locality.

*95. Gudgeon. *Gobio fluviatilis*, Flem.

Lynn. The Broad.—*P.*

'Abundant in the higher part of the rivers, but not, I think, otherwise than of rare occurrence amongst the broads.'—*Lubbock*.

'The upper part of the Yare, the Tudd, and the upper part of the Wensum.'—*J. H. G.*

'Gudgeons or *Funduli fluviatilis*; many whereof may be taken in the river within the city.'—*Sir T. Browne*.

*96. Rudd. *Leuciscus erythrophthalmus*, Linn.

Common in the broads and rivers.

Mr. Norman has taken one weighing 3 lb. 1 oz. Mr. T. G. Bagfield, of Norwich, states that a specimen of what he confidently believed to be the var. *L. cæruleus* (Swainson) was taken some years ago by Mr. Ewing, between Keswick and Cringleford Mills.

*97. Roach. *Leuciscus rutilus*, Linn.

Common in streams and broads.

Mr. Gurney remarks that they are very fine in the Yare and Wensum. Mr. Norman caught one at Yarmouth which weighed 2 lb. 2 oz.

'T. Lord of Norwich caught a roach at Ranworth, on July 31st, 1883, 3 lb. in weight, length 17 inches, girth $12\frac{1}{2}$ inches.'—*T. S.*

*98. Dace. *Leuciscus dobula*, Linn. (*L. vulgaris*, Day).

Common.

'Abundant and large in the upper Yare. Does not thrive in ponds.'—*J. H. G.*

This and the two preceding are mentioned in Sir T. Browne's list.

*99. Chub. *Leuciscus cephalus*, Linn.

'Is totally unknown in the Bure, the Yare, and, I believe, the Waveney. Is very large in some Norfolk rivers, the Ouse, the Thet, and the Wissey, near Stoke Ferry.'—*Lubbock*.

Sir T. Browne remarks: 'The chubbe . . . to be found in divers other rivers in England, I have not observed in these.'

*100. Minnow. *Leuciscus phoxinus*, Linn.

*101. Tench. *Tinca vulgaris*, Cuv.

Common in lakes and ponds.

Mr. Gurney says: 'The only river locality I know for the tench in Norfolk is in the Yare, above Trowse.' It occurs also in the Ouse above Denver. Mr. Norman informs me that the largest he has caught near Yarmouth weighed 5 lb. 14 oz.

The late Mr. Johnson, of Watlington, informed me that in the ponds there, wher-

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ever tench and roach are found together, the former are always large, and there are few young ones to be seen; where there are no other fish, the young tench are numerous, and they never attain to a large size. The variety known as golden tench (*T. aurea*) has in recent years been introduced into various parts of the county, and seems to have fairly established itself.

*102. Lake Bream. *Abramis brama*, Linn.

Ouse and Brandon rivers; very abundant and attaining a large size. Yare.—*J. H. G.*

'I have twice known a bream, of 7 lb. weight, taken in the Wensum, at Cossey. One of these specimens was: length $25\frac{1}{2}$ inches, depth $8\frac{1}{2}$ inches, thickness $3\frac{1}{2}$ inches, weight 7 lb. 1 oz. The large bream bear the local name of "bellows" in the neighbourhood of Norwich.'—*J. H. G.*

Stradsett Lake, $5\frac{1}{2}$ lb.—*Mr. Rust*, September 1st, 1881.

Mr. Norman, of Yarmouth, tells me he caught a bream which weighed 8 lb. 12 oz.

One weighing $11\frac{1}{2}$ lb. was caught in a pond at Beeston Regis, on June 17th, 1879. ♂ fish, very dark in colour, 26 inches long, 10 inches deep, and 26 inches in girth. A ♀ taken at Thorpe on the Yare, June 23rd, weighed $8\frac{3}{4}$ lb., and measured 23 inches long, and $19\frac{1}{2}$ inches in girth.—*T. S.*

The hybrid with *Leuciscus erythrophthalmus*, known as the Pomeranian bream, *Leuciscus buggenhagii*, Cuv. & Val, has been found in Surlingham Broad.—*Mr. Mills.*

'One taken at Cossey, upwards of 4 lb. in weight, is now in the Norwich Museum.'—*Lubbock.*

*103. White Bream. *Abramis blicca*, Bloch.

Norfolk Broad.—*Lubbock.*

*104. Bleak. *Alburnus lucidus*, Heck. & Kner.

Very abundant in ditches at North Wootton. I have seen some which were taken in the Ouse, below Denver sluice, at low water. Though probably occurring in other parts of Norfolk, these are the only localities in which I have any record of their having been taken. Gaywood River; 1878.

*105. Loach. *Nemachilus barbatula*, Linn.

'Not gregarious or abundant, but found in the smaller streams, wherever stones afford a lurking place.'—*Lubbock.*

MALACOPTERYGII

**106. Salmon. *Salmo salar*, Linn.

Yarmouth.

'Small ones have been very rarely taken in the mackerel nets'.—*Paget.*

Sir T. Browne observes: 'Salmon no common fish in our rivers, though many were taken in the Ouse; in the Bure, or north river; in the Waveney, or south river; in the Norwich river but seldom, and in the winter. But four years ago, fourteen were taken at Trowse Mill at Christmas, whose mouths were stuck with small worms, or horse leeches, no bigger than fine threads. . . . Most of our salmon have a recurved piece of flesh in the end of the lower jaw, which, when they shut their mouths, deeply enters the upper, as Scaliger hath noted in some.'

Of late years, the salmon seems to have disappeared from the Norfolk coasts. The only instance of which I have any record, is one which was caught in a flooded meadow at Lakenham, about December 1st, 1873. This was shown by Mr. Gurney to Dr. Günther, who pronounced it beyond doubt a true salmon. It has been presented by Mr. Birkbeck to the Norwich Museum.

Mr. Gurney says this is the first Norfolk salmon he has seen.

Mr. Southwell informs me that one was taken on January 15th, 1869, below the New Mills, which weighed 15 lb., and is now in the possession of Mr. C. J. Greene, Norwich. On January 29th, 1869, he saw one in the Norwich fish market weighing $17\frac{1}{2}$ lb., which was taken by some boys in the flooded meadows at Trowse. And on February 6th, 1884, a male kelt, measuring 37 inches, and weighing 13 lb., was taken, under similar circumstances, in a ditch on Trowse Common. One caught with fly, by Mr. G. F. Buxton, in the Stoke river, weighed 6 lb., May 20th, 1897. Mr. Buxton had it preserved for the Norwich Museum.—*T. S.*

'One $13\frac{1}{2}$ lb. taken in draw-net at Gorleston, May 17th, 1898.'—*T. S.*

**107. Sea Trout. *Salmo trutta*, Linn.

Frequently caught in the Ouse and Estuary. In the Bure and Waveney.—*Lubbock.*

Mr. Stevenson reports that one was taken with rod and line at Lyng Mills, March, 1862. It weighed 15 lb., and was 31 inches in length. Another taken at the same place soon afterwards weighed 10 lb.

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Mr. Gurney thinks these could not have been *Salmo trutta*, 'as no sea trout could ascend the river higher than the New Mills at Norwich.'

Mr. Dowell observes that the salmon trout remains on our coasts at all times of the year, but he has never seen it with roe.

In the *L'Estrange Household Book*. 'Item.—Paid for a samon trout, x^d.'

*108. Brown Trout. *Salmo fario*, Linn.

Narborough, Castleacre, etc.

Bure and Yare.—*Lubbock*.

Mr. Gurney thinks the supposed 'salmon' from Cossey and Swanton, mentioned in *Lubbock's Fauna*, were of this species, also the Lyng specimen recorded by Mr. Stevenson, and he adds: 'It is remarkable that this fish, though abundant in the Wensum, is not a native of the Upper Yare, and an attempt to introduce them artificially by hatching ova in the Yare appears to have failed. In the Tudd, a small stream intermediate between the Upper Wensum and Upper Yare, trout are found and grow large, but are said to be descended from some artificially introduced from thirty to forty years ago. If trout exist in the Yare, as stated by *Lubbock*, I believe it is only in the lower stream, after it has been joined by the Wensum.'—*J. H. G.*

Sir T. Browne mentions 'the *trutta*, or trout, and the *gammarus*, or crawfish, but scarce in our rivers; but frequently taken in the Bure or north river, and in the several branches thereof'; and he adds, 'very remarkable large crawfishes to be found in the river which runs by Castleacre and Nerford.' Query: Are they still to be found in that locality?

One caught at Fakenham Mills, July 26th, 1879, weighed 9 lb. 6 $\frac{3}{4}$ oz.—*T. S.*

[Lake Trout. *Salmo ferox*, Jardine.

Mr. J. J. Coleman, of Norwich, a few years since, hatched a number of the ova of this variety, and introduced them into the small streams near Eaton and Cossey.

'A few more,' he says, in a letter to Mr. Gurney, 'went to the Stoke (Holy Cross) river, and some to the stream between Keswick Mills and Lakenham. I gave some to Mr. Cozens Hardy, of Letheringsett, but I believe they were all eaten by ducks. In the Eaton stream there are scarcely any to be seen, though I have taken only about two fish out—one of them was undoubtedly a Lake trout, weighing three or four pounds.']

[American Brook Trout. *Salmo fontinalis*, Mitchell.

'Mr. C. L. Buxton has placed a large number of these fish in a stream at Bolwick, and although at first they seemed to thrive, they have since disappeared. The Fish Acclimatization Society has hatched out and deposited a large number of various species of *Salmonidæ* in the rivers of Norfolk and Suffolk, but I cannot learn that their efforts have, at present, been attended with much success.'—*T. S.*

Mr. Day says: 'A "Conservator" writing from Shropshire to the *Field*, remarked that he considered it useless for turning into a running water, as it drops down stream, while it does not attain to the size of our brook trout, and in a lake will not rise well to the fly. He thought it as bad as pike in destroying other fish, consequently he did not recommend it, although it is excellent eating, and fights well when hooked.'

'In Norfolk it is said to grow twice as quickly as the brook trout' (*British Fishes*, vol. iii. p. 120).]

*109. Grayling. *Thymallus vexillifer*, Linn.

Mr. Patterson writes, October, 1893: 'A Mr. Pearson informs me that grayling having been introduced into the Wensum, near Fakenham, have become numerous and a complete nuisance, bullying the trout and monopolising their habitats.'

110. Smelt. *Osmerus eperlanus*, Linn.

Very abundant in the shallow waters of the Estuary, and on the Burgh Flats, Yarmouth, where they often attain a large size.

Mr. Norman has measured some taken at the latter place, which were 11 $\frac{1}{2}$ inches long, and weighed 7 oz. I have seen fish of exactly the same size and weight taken on the Ouse (Feb. 21st, 1874). These were full of roe. In 1867 I saw one which was a foot long, and which weighed only a quarter of a pound.

The smelt fishery is much damaged by the practice of taking them in the rivers during the spawning season. Immense quantities are caught in what ought to be the close season, when they are watery and insipid. There ought to be a strict prohibition against taking them whilst in the rivers.

In Sir T. Browne's list mention is made of 'spirinches, or smelt, in great quantity about Lynn; but where they have also a small fish called a *priame*, answering in taste and shape to a smelt, and perhaps are but a younger sort thereof.'

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'The Germans, owing to its aroma, term it the "Stinkfisch."—*Day*.

'Lubbock observed the migrations of roach and dace in Norfolk fleeing from the smelts,¹ which regularly ascend the rivers in spring to spawn' (*Day's British Fishes*, vol. ii. p. 122).

'They ascend the Norwich river as far as the New Mills, where great numbers are taken every season.'—*J. H. G.*

Mr. Southwell informs me that many are kept alive in tanks in the Norwich fish-market till required for use.

111. Anchovy. *Engraulis encrasicolus*, Linn.

Frequently caught during the summer months in stow-nets, in the river opposite Lynn. They are generally from 7 to 8 inches in length.

Yarmouth: 'A specimen found on this beach, May, 1830.'—*Paget*.

This is probably the same referred to in Yarrell's *British Fishes*, communicated by Mr. Dawson Turner, September 30th, 1899.—*A. P.*

112. Herring. *Clupea harengus*, Linn.

Mr. T. Southwell has kindly sent me the following official return of the number of herring landed at the fish-wharf in the autumn fishery at Yarmouth and Lowestoft.

Year	No. of Lasts, ² Yarmouth	Lasts at Lowestoft
1867	No account	6,154
1868	15,511	7,035
1869	13,386	6,912
1870	18,709	10,456
	and 2,000 at Quay	~
1871	19,871	14,390
	and a great quantity landed at Quay	
1872	14,500	6,920
1873	18,795	10,937

The herring is frequently mentioned in the *L'Estrange Household Book*. 'Item.—To John Browne, of Lynn, for ij barrels of white herýnges, xxij^d.' 'Item.—Paid to Richard Bessye, of Lynn, for ij cases of red herýngs, xvj^d.'

The variety known as Leach's herring (*Clupea leachii*), which Yarrell considered a good species, is now no longer regarded as such.

¹ M. de la Blanchère observes that the odour of the smelt drives other fish away, and thus protects it from its enemies.

² The number of fish in a last is 13,200.

113. Pilchard. *Clupea pilchardus*, Linn.

Yarmouth: 'Some few generally taken every year in the herring-nets; in some years they have been abundant.'—*P.*

'Though this sea aboundeth not with pilchards, yet they are commonly taken among herrings; but few esteem thereof or eat them.'—*Sir T. Browne*.

Yarmouth: August 12th, 1891.—*A. P.*

'Some taken June 23rd, 1897. A few are taken every spring; several in May and June, 1895; and one, which I did not see, in the week ending October 15th, 1898.'—*A. P.*

114. Sprat. *Clupea sprattus*, Linn.

Sir T. Browne says: 'Herrings departed, sprats, or *sardæ*, not long after succeed in great plenty, which are taken with smaller nets, and smoked and dried like herrings, become a sapid bit and vendible abroad.'

On the coast of Norfolk and Lincolnshire many hundreds of tons of sprats are annually used for manure, a waste of valuable food much to be regretted. Were a company formed for preserving them after the manner of sardines, to which they are in no respect inferior, a vast amount of food might be saved, and the undertaking, if properly managed, be made very remunerative.

Dr. Dowell says, that though he has seen vast quantities of these fish caught he never yet saw one with roe.

Considerable quantities are prepared and sold as anchovies and anchovy paste.

**115. Shad. *Clupea alosa*, Linn.

Yarmouth: 'not uncommon with herrings.'—*P.*

New Mills, Norwich, June, 1840.—*Lubbock*.

'Two specimens, male and female, caught at Lowestoft in May, 1840. Weighed, the male, 3½ lb.; the female, 4½ lb. Both are preserved in the Norwich Museum.'—*J. H. G.*

Sir T. Browne says: 'Alosa, or shads, to be met with about Lynn.'

Norfolk Estuary, 1851; specimen in Wisbeach Museum.

'One taken at Yarmouth, April 27th, 1893, weighed 4¾ lb.'—*A. P.*

**116. Twait. *Clupea finta*, Cuv.

Lynn Roads, September, 1848, and October, 1867. Mr. E. L. King, Yarmouth.—*A. P.*

'One taken with a draw-net off Yarmouth,

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April 19th, 1893, was 17 inches long and weighed $4\frac{3}{4}$ lb.—*A. P.*

A previous capture of a smaller one on Breydon is recorded in the *Transactions* (vol. v. p. 324).

APODES

**117. Eel. *Anguilla vulgaris*, Turton.

Very common. Mr. Lubbock says that one was caught near Norwich which weighed upwards of 20 lb.

'One taken in the Ouse at Denver Sluice, October 22nd, 1867, was recorded in *Land and Water* of the 28th of that month, by E. A. Austin, Esq., Sydney Sussex College, Cambridge. Its dimensions were—length, 5 feet 8 inches; girth, $17\frac{1}{4}$ inches; weight, 36 lb.' (*Fauna of Norfolk*).

An albino, with body of a creamy white, the lips pink, the dorsal and anal fins tinted with the same, coloured eyes, was taken in the river Bure, June 6th, 1895. Since the last report on the fishes Professor Grassi has read his most interesting account of the 'Reproduction and Metamorphosis of the Eel' at the Royal Society, 1896. In his paper he has proved that eels of all kinds breed only in the sea at great depths, and he has shown that leptocephalus in its various forms are larval conditions of murcenoids, conger, anguilla, etc.

118. Conger. *Conger vulgaris*, Cuv.

Norfolk Estuary. Not uncommon.

Yarmouth.—*P.*

'One weighing nearly 50 lb. caught in 1808.'—Cromer, *J. H. G.*

GANOIDS

**119. Sturgeon. *Acipenser sturio*, Linn.

Frequently caught in the rivers and along the coast, and chiefly, as Mr. Southwell has remarked, in the winter and spring months.

Sir T. Browne, with his usual accuracy, notes the variation in form which occurs in this species: 'Some have been taken at Yarmouth, and more in the Great Ouse, but their heads are not so sharp as represented in the icons of Rondeletius and Johnstonus.'

Couch, speaking of the supposed two kinds of sturgeon, says: 'The broad-headed and narrow-snouted varieties in their extreme divergence differ greatly, and the latter appears to be the more numerous of the two; but there has been found every gradation of form amongst them' (vol. i. p. 159).

The lord of the manor of Hunstanton claims as a royalty all sturgeons caught in Lynn waters, but this claim is not recognized by the Lynn authorities. The largest specimens of which I have any note are—one caught off Yarmouth, October 10th, 1871, of which Mr. Southwell gives the following measurements: length, 7 feet 10 inches; girth, 46 inches; weight, 392 lb.; and one recorded by Mr. Gunn, in the *Zoologist*, 1866, taken in Holkham Bay, was 8 feet 6 inches long, and weighed 210 lb. The capture of a sturgeon on a hook is a sufficiently rare event to be worth recording.

'On December 7th, 1894 (*Zoologist*, Dec. 10th, 1894), a beach fisherman caught one 6 feet 6 inches in length, having baited his hook with a herring.'—*A. P.*

CHONDROPTERYGIANS

120. Rough Hound or Small-spotted Dogfish. *Scyllium canicula*, Linn.

Norfolk Estuary. Specimen in Lynn Museum.

Lowestoft.—*J. H. G.*

121. Nurse Hound or Large-spotted Dogfish. *Scyllium stellare*, Linn.

Norfolk Estuary.

Yarmouth.—*P.*

Sherringham.—*J. H. G.* This specimen is in the Norwich Museum.

122. Basking Shark. *Selache maxima*, Linn.

Yarmouth.—*P.* The figure in Yarrell's work was taken from drawings of this speci-

men, sent to Mr. Yarrell by Mr. J. H. Gurney.

Sir T. Browne says: 'This year (1662) one was taken, entangled in the herring-nets, about 9 feet in length, answering to the last figure of Johnstonus (lib. vii.), under the name of *Carcharius alter*, and was by the teeth and five gills one kind of shark, particularly remarkable in the vastness of the optic nerves and three conical hard pillars which supported the extraordinary elevated nose, which we have reserved with the skull. The seamen call this a *scrape*.'—Bohn's edition, vol. iii. p. 326. Dr. Günther thinks this is probably the same fish as that figured by Couch (vol. i. pl. 15),

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and which he takes to be a monstrosity of the basking shark (*Selache maxima*).

123. Porbeagle. *Lamna cornubica*, Gmel.

Yarmouth.—P.

Mundesley: 'A large specimen, the skull of which is in Norwich Museum.'—*J. H. G.*

'Yesterday a young porbeagle shark was found alive, stranded on Overstrand beach. It was 25½ inches long from snout to tail.'—*J. H. G.*, in *lit.*, November 12th, 1880 (*T. S.*).

In addition to four examples previously recorded, Mr. Southwell tells of one he saw in Norwich market, and he has heard of several others. Mr. Patterson writes that one, taken at Yarmouth, September 30th, 1893, measured 6 feet 6 inches in length. He also mentions a 7-foot specimen in Yarmouth fish-market, October 17th, 1891 (*Trans. Nat. Hist. Soc.*, vol. v. p. 326).

'Another at Yarmouth, September 26th, 1894; length, 9 feet.'—*A. P.*

124. Thrasher. *Alopias vulpes*, Gmel.

Yarmouth. Mr. Gunn reports the capture of one by one of the crew of a lugger engaged in the mackerel fishery, July 4th, 1867. Its total length was 14 feet 5 inches; girth below pectoral fin, 6 feet; tail, from tip to root, 7 feet 4 inches.

This species was first described by Dr. Caius from a specimen stranded between Lowestoft and Pakefield, in February, 1570. Vide *De Canibus Britannicis*, etc., lib. ii.; *De Rariorum Animalium*, etc., p. 28.

'In *Land and Water* for November 22nd, 1884, mention is made of a thrasher shark which was caught off Palling by some long-shore herring-fishers, on October 2nd, 1884; it was said to measure 6 feet in the body, the tail also being 6 feet long.'—*T. S.*

125. Smooth Hound. *Mustelus lævis*, Flem. (*M. vulgaris*, Day).

Norfolk Estuary.

126. Hammer Head. *Zygæna malleus*, Risso.

Only one is mentioned as having been taken at Yarmouth, November 24th, 1829. This is referred to in Messrs. Paget's list, and in Couch's *British Fishes*. The head and tail were presented to the Norwich Museum by Mr. Dawson Turner.

127. Tope. *Galeus vulgaris*, Flem.

'Yarmouth, 14 inches.'—*A. P.*

Mr. Cresswell has caught large numbers with night lines, off Hunstanton. In the years 1872-73 he took more than a hundred. Forty-five were caught at one time, two of which, measuring over 5 feet long, he kindly

sent to me for examination. All the females contained fully-developed young ones more than a foot in length. The season at which these take a bait is in June and early in July, after which time they cease to be caught. Their food at this time appears to consist chiefly of crabs and starfish.¹

128. Blue Shark. *Carcharias glaucus*, Linn.

Yarmouth.—P. 'In the autumn.'—*Patterson*.

I have no authentic record of this fish being taken in the Estuary, and suspect that the tope is sometimes mistaken for it. Thus, two specimens in the Wisbeach Museum, said to be blue sharks, are in reality topes. Mr. T. E. Gunn records one specimen stranded on the beach at Yarmouth, December 19th, 1866, and gives the following measurements: total length, 5 feet 4 inches; length of head, 10½ inches; girth to first dorsal, 1 foot 7 inches. These might, in the absence of other characters, apply equally to the tope.

129. Picked Dogfish. *Acanthias vulgaris*, Risso.

Norfolk Estuary. I have frequently met with small specimens of this species taken in trawl-nets, but have never been able to observe those attempts at using its spines with such wonderful sagacity as Couch describes (p. 51). That they often inflict a wound when springing from the hand of their captor is not improbable; but that it is done with intention, intuitive perception, and mathematical accuracy described by writers, is contrary to all I have been able to ascertain by careful observation.

130. Greenland Shark. *Læmargus microcephalus*, Bl. Schn.

'An immature specimen caught at Sherringham is in the Norwich Museum.'—*J. H. G.*

'A Greenland shark, 15 feet long, was captured in shallow water off Caistor, Great Yarmouth, on November 11th, 1885. It was exhibited afterwards at Yarmouth. On January 21st, 1892, another, 13 feet 2 inches long, was captured by some Lynn fishermen, and landed at the Purfleet Quay; and on July 12th of the same year the Overstrand fishermen captured yet another, which had got into shallow water. This last measured 10 feet in length, and, I believe, was purchased

¹ Mr. Patterson sends me a note of a small one, 14 inches long, caught at Yarmouth. It is remarkable that so few of this species occur at Yarmouth, while they abound to such an extent in the Norfolk Estuary at Hunstanton.

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for the Hon. W. Rothschild's Tring Museum.'—*T. S.*

131. Monk-fish or Angel. *Rhina squatina*, Linn.

Paget mentions two which were taken at Yarmouth since 1817. One captured in the Norfolk Estuary by Mr. E. L. King, in 1865, measured 4 feet in length, by 2 feet 6 inches in breadth. One at Yarmouth, 49 inches long, June 2nd, 1890.—*A. P.*

132. Torpedo. *Torpedo marmorata*, Risso. Yarmouth.—*A. P.*

'One found alive on the beach at Sea Palling, and preserved by Mr. Gunn, of Norwich, February 23rd, 1883.'—*T. S.*

133. True Skate. *Raia batis*, Linn.

Very common.

This and the succeeding species are mentioned in the *L'Estrange Household Book*, A.D. 1519. Item.—'Flathe and Thornbacke, xij^d.'

Stödelér says that all the plagiostomi contain *urea* in their different organs—in fact, in their whole body (*Philosophical Journal*, January, 1860).

134. Thornback. *Raia clavata*, Linn.

Very common. This is named in Sir T. Browne's list.

135. Homelyn or Spotted Ray. *Raia maculata*, Mont.

Common.

136. Starry Ray. *Raia radiata*, Donovan.

Yarmouth.—*A. P.* 'Length 22 inches. May 14th, 1897.'

137. Cuckoo Ray. *Raia circularis*, Couch.

'Female, 26 inches. Great Yarmouth, May, 1897.'—*A. P.*

'Two examples were brought into Yarmouth on February 4th and 16th, 1897, by longshore boats; and three others (one of which is in Norwich Museum) on April 16th of the same year. A beautiful specimen taken on a long line off Yarmouth, April 5th, 1898.'—*A. P.*

138. Sting Ray. *Trygon pastinaca*, Linn.

Mentioned in Sir T. Browne's list and in Paget's *List of Yarmouth Fishes*. Mr. Elwes has taken it in the Norfolk Estuary; and Mr. Gurney mentions one, weighing about 2 stones, which he saw taken off Kersingland, Suffolk, September, 1856, which had a double spine.

A specimen, 2 feet in length, with a double 'sting,' is recorded by Mr. Patterson, January 5th, 1897.

T. E. Gunn records one from Yarmouth, in 1869, 3 feet 6 inches long, which weighed 4 stones.

One weighing 30 lb. brought in by a Yarmouth boat, May, 1894. Another seen on fish wharf, January 5th, 1897.—*A. P.*

A 15-lb. example on fish wharf, May 18th, 1898; another nearly as large with it. Not unfrequent this month.

139. Eagle Ray or Whip-Ray. *Myliobatis aquila*, Linn.

A specimen taken in the Norfolk Estuary is in the Lynn Museum; and the skeleton of one found dead on Lowestoft beach, June 19th, 1867, is in the possession of Mr. Harper, chemist, Norwich.—*T. E. Gunn.*

CYCLOSTOMES

- **140. Sea Lamprey. *Petromyzon marinus*, Linn.

Norfolk Estuary.

Mr. Lubbock says they are abundant in the Yare in April and May, when they run up to spawn.

Mr. Gurney has twice seen a large lamprey caught immediately below the New Mills, at Norwich; and one of these two specimens is preserved in Norwich Museum.

Mr. Bayfield mentions one, 28½ inches long, which was caught in Barton Broads, June, 1873.

Sir T. Browne says: 'Lampreys, great and small, found plentifully in Norwich rivers,

and even in the city, about May, whereof some are very large; and, well cooked, are counted a dainty bit, collared up, but especially in pies.'

- **141. Lampern. *Petromyzon fluviatilis*, Linn.

Often caught, at low water, in stow-nets opposite Lynn. Norwich.—*Lubbock.*

- *142. Mud Lamprey. *Petromyzon branchialis*, Linn.

Keswick, near Norwich. — *J. H. G.* 'Numerous in ditches containing springs, to which these fish appear to be attracted.'

REPTILES AND BATRACHIANS

This section of the fauna of Norfolk will occupy a very small space, but there are two facts to which I should like briefly to refer. The first is the discovery of the remains of the European freshwater tortoise (*Emys orbicularis*, Linn.) in certainly a very recent deposit, and under circumstances which, regarded in conjunction with other finds in the same neighbourhood, seem to render it not impossible that this species may have existed contemporaneously with the human inhabitants of the locality. This interesting occurrence was brought to light through the vigilance of Professor Newton, and was by him communicated to the *Ann. and Mag. of Nat. Hist.* for September, 1862 (vol. x. p. 224). In the year 1836 Mr. Wyrley Birch, the proprietor of the Wretham estate, when cleaning out a peat bog by the side of a spring pit at East Wretham, found, about seven feet below the surface and beneath a bed of hypnum, a number of bones and a good part of the outer skeletons of two small tortoises, which proved to belong to this species. It is worthy of mention that in another lake or 'mere' in the parish of West Wretham, the remains of a pile building were discovered, around which were a very large number of the bones of *Bos longifrons* and *Cervus elaphus*, which, in addition to the artificial character of the site in which they were found, bore evident traces of man's handiwork. Professor Newton expresses the opinion that the manner in which these bones had been treated is not only conclusive evidence that the long-faced ox was contemporaneous with man, but also strong presumptive evidence that this animal was domesticated by the aborigines of Britain before the Roman invasion.

The remains of *Emys orbicularis* have also been found, in the year 1863, in the deposit known as the 'Mundesley river bed,' a freshwater deposit of small extent on the Norfolk coast of post-glacial origin.¹

The other species to which I wish to refer is the edible frog (*Rana esculenta*, Linn.), which, even if it be a doubtful native, has so curious and interesting a history in this and the adjoining county of Cambridgeshire that it should not be passed over without a brief notice. This Batrachian was discovered at Whaddon, and in Foulmire Fen in Cambridgeshire, as long ago as the year 1844, and Professor Bell was assured that it had

¹ See E. T. Newton, *Geol. Mag.*, 1879, p. 304; and H. B. Woodward, *Trans. Norf. and Nor. Nat. Soc.*, iii. (1880) p. 36.

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long existed in those localities, and from the loudness of its voice had gained the names, 'Whaddon organ' and 'Dutch nightingale.' Subsequently it became known that the late Mr. George Berney of Morton Hall, near Norwich, had in 1837 brought from Brussels and Paris two hundred edible frogs and a large quantity of spawn, which he deposited in the meadows and ditches at Morton, Hockering and Foulden, Norfolk. In 1841 he imported another lot from Brussels, and again, in 1842, others from St. Omar; these were deposited in the same places and many hundreds in the fens at Foulden. In June, 1853, nothing having been heard of Mr. Berney's importations in the meantime, Professor Newton discovered a colony of these animals at Rockland All Saints; again, in May, 1876, he rediscovered them in a pond at Stow Bedon after they had been searched for in vain in the former place. It might have been fairly assumed that these Norfolk colonies were descended from Mr. Berney's introduced frogs and were therefore of the French or Belgian form, which Mr. Boulenger distinguishes as *Rana esculenta typica*; but that gentleman upon examining specimens from all three localities was surprised to find that though those from Foulden belonged to this form and doubtless owed their introduction to Mr. Berney, others obtained from Foulmere (Cambs.) and Stow Bedon (Norfolk) proved to be examples of a race abundant in Italy, which he names *R. esculenta lessonæ*, Camerano, and with regard to which it seems exceedingly difficult to imagine when, and under what circumstances, it could have been introduced here by man. The conclusion to which Mr. Boulenger arrives is as follows:¹ 'A great deal of discussion has taken place as to whether the edible frog is indigenous in England or introduced; the balance of evidence seems to be in favour of the latter supposition, although we do not know when and by whom the Cambridgeshire and Stow Bedon colonies were imported. The fact that they belong to a race especially abundant in Italy, and formerly believed to be confined to that country, has suggested the idea that they may be of Italian origin, perhaps introduced by the monks.' However that may be, we have in Norfolk both the typical form introduced by Mr. Berney, and the Italian form of unknown origin.

REPTILES

1. Common Lizard. *Lacerta vivipara*, Jacq.

The common lizard is frequent on sandy heaths, hedge-banks and dry places. Locally known as the 'swift.'

2. Slow-worm. *Anguis fragilis*, Linn.

The slow-worm is not uncommon on dry heaths and in woods, but shows a remarkable partiality for particular spots, where it may be looked for with tolerable certainty. It is known here in some districts as the 'glow-

worm.' The real glow-worm being called the 'glaze-worm.'

3. Common or Ringed Snake. *Tropidonotus natrix*, Linn.

The common or ringed snake is, although not so common as formerly, still abundant in suitable localities.

4. Viper or Adder. *Vipera berus*, Linn.

The viper is frequent on heaths and waste places.

¹ *Tailless Batrachians of Europe*, part ii. p. 287: Ray Society, 1898.

REPTILES AND BATRACHIANS

BATRACHIANS

1. Edible Frog. *Rana esculenta*, Linn.
2. Common Frog. *Rana temporaria*, Linn.
Abundant.
3. Common Toad. *Bufo vulgaris*, Laur.
Abundant.
4. Natterjack Toad. *Bufo calamita*, Laur.
The natterjack toad is more local than rare ; abundant in some localities.
5. Great Warty Newt. *Molge cristata*, Laur.
Common. Locally the newts are called 'efts.'
6. Common Smooth Newt. *Molge vulgaris*, Linn.
Common.
7. Palmated Smooth Newt. *Molge palmata*, Schneid.
Mr. F. Norgate has found this species at Sparham.

BIRDS

In order rightly to interpret the full significance of a local fauna, it is essential that all the circumstances which tend to render attractive the region forming the home or place of temporary resort of its members should be studied in detail. But this falls within the provinces of the geologist and botanist, and I must only in this place describe somewhat fully certain physical features which, by reason of their peculiar attractiveness, in a great measure account for the exceptional richness of our ornithology. In no part of the British Isles are such localities more abundant than in the county of Norfolk, a fact due in part to its favourable geographical position, but perhaps in an even greater degree to the endless diversity of its soil and surface, and to that happy admixture of land and water, sea shore and estuary, so grateful to a large majority of the feathered visitants, whose varied requirements are thus fully met. We can boast of no violent transitions from mountain to valley, forest or treeless waste, rocky glen or rushing torrent; still, so great is the variation in the physical features of the county, even though the scale be not a very extensive one, that we are fully justified in applying Fuller's oft-quoted remark that 'all England may be carved out of Norfolk, being represented in it, not only as to the kinds but degree thereof; for here are fens and heaths, light and deep, sand and clay grounds, meadow-lands, pastures and arable, woodlands and woodless';¹ and this, to a great extent, holds good even in the present day, in spite of the many changes which have taken place since the words were penned. Fortunately, the late Mr. Stevenson, in the Introduction to his *Birds of Norfolk*,² has so ably handled this subject that a brief summary of his exhaustive article must suffice. There are, however, two special localities which demand more careful description, as they are unequalled for the attractions they offer to a certain class of birds, and these I shall speak of further on.

Mr. Stevenson divides the county into six distinct and well-marked regions, the characteristics of each of which are still very apparent, and these he names as follows: 1, the 'Broad' district; 2, the 'Cliff'; 3, the 'Meal'; 4, the 'Breck'; 5, the 'Fen'; and 6, the 'Enclosed' district. To each of these it may be well to devote a few words.

1st. The 'Broad' district is a triangular tract of country forming the most easterly portion of the county, and including that part of Suffolk known as Lothingland. It is comprised within a line drawn

¹ *Worthies of England* (1662) 4to edit. 1811, vol. ii. p. 124.

² *Birds of Norfolk*, vol. i., Introduction, pp. i.-lxxii.

BIRDS

from Lowestoft Harbour inland to Norwich, and thence in a north-easterly direction to the sea at Happisburgh. So much has been written about the Norfolk broads of late that it will suffice to say most of them are situated adjacent to the river Bure or between that river and the sea. Two, however, Surlingham and Rockland Broads, are on the river Yare, within five or six miles of Norwich, and the picturesque lake known as Fritton Decoy, with its active decoy, is in Lothingland, south of Yarmouth. These broads are of all sizes, from mere 'pulk-holes' to Hickling, the extent of which is about 464 acres, and Breydon, with its 1,295 acres at high tide. In all, large and small, there are something over forty of them. They are estimated to cover some 5,000 acres with water. Some are deep, others shallow, some wooded to the water's edge, but most of them are deeply fringed with reed-beds and surrounded by many acres of sedgy marsh. In this section was the breeding-place in former times of the cormorant and the spoonbill, the bittern, godwit, avocet, and black terns innumerable, harriers and ruffs, many ducks and waterfowl, and the rare Savi's warbler. Most of these are lost to us, but some still remain in greatly reduced numbers.

As Breydon Water (A.-S. *brædan*, to spread out or broaden) will be so often mentioned in the notes which follow, it seems desirable to devote a few lines to its more particular description. This great tidal lake at its upper end receives the united waters of the rivers Yare and Waveney, with other smaller streams, and near its outlet at the town of Great Yarmouth is entered by yet another river, the Bure, or 'North River,' which flows from the north-west.¹ At high water it is nearly four miles in length and not quite a mile in width at its broadest part, but when the tide is out it presents a vast expanse of mud-flat, intersected by drains and creeks, the drier portions covered with aquatic vegetation, the whole forming an ideal resting and feeding place for waterfowl innumerable. The river Yare and the walls of Breydon from Reedham to Yarmouth, a distance of about six miles, form the southern boundary of a great alluvial plain some 14,000 acres in extent, formerly one of the finest snipe grounds in England, and the breeding-place of vast numbers of ruffs, redshank and lapwings, but now drained, and affording summer pasturage to large herds of cattle and sheep. This Breydon has probably produced more rare ducks and waders than any like extent in the kingdom. I will only mention a few which have been added to the list of British migrants from birds first obtained at or near this favoured water and its affluents: Savi's warbler, red-footed falcon, pectoral sandpiper, Siberian pectoral sandpiper, broad-billed sandpiper, white-winged tern, Caspian tern, Caspian plover, red-crested pochard, and on the adjoining coast the buffle-headed and Steller's ducks; to which might be added many other species almost equally rare.

2nd. The 'Cliff' district lies chiefly at the north-east corner of the county, between Happisburgh and Weybourne. The cliffs vary in height

¹ The rivers of Norfolk have been estimated to extend to a length of some 200 miles.

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from twenty to two hundred and fifty feet, their composition is clay, sand, and chalk boulders, and their extent some twenty miles.¹ Near the extreme north-west corner of the county the chalk crops out, forming a bold range of cliffs of no great extent facing the west, and once the breeding-place of the peregrine falcon, but at present only the resort of numberless swifts, sand martins and sparrows; these, and the smaller passerine birds, nesting in the rough herbage and gorse bushes which maintain a hold wherever possible in the clay cliffs, are the only present inhabitants.

3rd. The 'Meal' district (from the Anglo-Saxon *mæl*; Icelandic *möl*) is a wild tract of sandy hillocks with miles of salt-marshes, intersected by tidal creeks and rivers, lying between the shore and the cultivated lands. These hills of blown sand, held together by the 'marram' grass, extend all along the coast from Weybourne to Old Hunstanton with very little intermission; thence the marshes, but in a more advanced stage of reclamation, extend nearly to the town of Lynn, with occasional shingle beaches and extensive tidal sands. The 'Meals' abound with rabbits, and offer great attraction to the larger raptorial migrants; they form nesting-places for the stock-dove, wheatear, and many other birds, and in places are visited in summer by colonies of terns, ring-dotterels, redshanks, and a few oystercatchers and sheld-ducks. I mentioned earlier two localities which were worthy of special description owing to the interest attaching to them, arising from the number of rare migrants which have been there obtained. The first of these was Breydon, already disposed of; the second is Blakeney Point, which forms a part of the section now under consideration.

On the north coast, about midway between Weybourne and Wells, the little river Glaven approaches its outlet into the sea; just before reaching the town of Cley it is closed by a sluice and from that point is tidal, forming the harbour of the ancient and once important port of Cley-next-the-Sea. Thence the channel of the Glaven runs across the salt-marshes in a northerly direction to within about five hundred feet of the sea, when it is stopped by a huge raised bank of shingle, and its course is deflected sharp to the west with a slight trend inland; nearly two miles from this point it is joined by the channel which runs up to the town of Blakeney, and then the united waters, after flowing something more than another mile, finally sweep round to the north again and enter the sea. The trend of the coast is in a north-westerly direction, the tract therefore lying between the river Glaven and the sea forms almost an island, its only connection with the mainland being the narrow shingle bank at the eastern extremity already mentioned. This isolated portion of the coast extends, from east to west, about three and a half miles, and its greatest width is nearly one mile, its form being something like that of a 'Prince Rupert's Drop,' the pointed end towards the east. The sea boundary for the greater part of its length is a huge raised bank of

¹ The coast-line of Norfolk extends to about 100 miles.

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shingle, but as the broad extremity is approached it gradually merges into the sand hills which are the normal characteristic of the 'Meals', the shingly depressions lying between the hills form channels into which exceptionally high tides occasionally break, but for the most part they are dry. On the shore side of the shingle bank is a strip of salt-marsh gradually merging into the mud-flats bordering the river. As the shore becomes dryer it is covered with vegetation, first by great sheets of brilliant green marsh-samphire (*Salicornia*) succeeded by acres of sea lavender (*Statice*), and higher up still are thickets of *Suaeda fruticosa* offering any amount of shelter. I cannot give a detailed list of the vegetation of this favoured spot and it is more the abundance of the individual plants than the number of the species which is so surprising, but I may say that on a casual visit with my friend, Mr. Geldart, we here collected thirty species of plants. At the close of summer the warm sandy soil under the *Suaeda* bushes swarms with insect life, which with the seed-bearing plants afford an abundant feast for both insectivorous and fruit-eating birds; lower down, I have seen the coarse marine vegetation literally blackened with the young of *Littorina rudis*, and alive with tiny shore-crabs, whilst the tide-pools swarm with countless crustaceans, and the wet sand with marine worms. To the east and west stretch many miles of salt-marsh in the parishes of Salthouse on the one side and Stiffkey and Warham on the other. Such is Blakeney Point, the first landing-place of many a weary migrant on British soil, a spot which seems to have been endowed with all the essentials for their rest and recuperation. No wonder that it should be found so frequently mentioned in the notes which follow, where Cley and Blakeney must be taken as almost synonymous terms. One other attraction must also be mentioned here—the hospitable lake at Holkham which the Earl of Leicester reserves as a sanctuary for the waterfowl which flock there in immense numbers. I must rest content with giving an extract from my note-book and leave it to speak for itself, but I would remark that the estimate of the number of fowl there mentioned was made by Mr. Alexander Napier, a resident on the spot, and one of the keenest field naturalists and sportsmen I know. On the 21st of February, a few years ago, there were on the lake 3 goldeneyes, 3 male smews, 17 goosanders, 1 pintail, 4 shovelers, 200 tufted ducks, 40 pochards, 1,000 wigeon, 1,500 mallards, 100 teal, 400 coots, 100 black-headed gulls, Egyptian and Canada geese in numbers and moorhens in great quantity,¹ whilst on the marshes might be seen at a safe distance great flocks of pink-footed geese feeding at leisure. Mr. Napier tells me that in the present winter (February, 1900) the smews and goosanders are there, and more ducks than he has seen for years.

4th. The 'Breck' district, a great tract of heath and sheep walk with wide open fields, stretching from south to north on the western side

¹ It was a sight never to be forgotten, the wigeon feeding and resting on the shore hid the grass and the mallards were so tame that they simply shuffled off the bank as we approached and swam out, not troubling to take wing; wonderful as the sight was it was not exceptional.

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of the county, bordering on the Fens. Here was the home of the great bustard and is still that of the stone curlew, ring plover and of several species of ducks which abound in the curious lakes known as 'meres,' found more especially on the lonely heaths about Wretham and Merton.

5th. The 'Fen' district in the extreme west of the county, which extends from Brandon to Lynn, and is bounded by the counties of Cambridgeshire and Lincolnshire. This also includes some 57,000 acres of reclaimed land known as marshland. The 'Fens' in past times abounded with the three species of harriers, the bittern, ruff, black tern, and many other birds. This division also shared with the 'Broads,' the distinction of harbouring Savi's warbler, but (like the other species enumerated) it has disappeared before improved drainage which has changed this division of the county perhaps more than any other, the only piece of true sedge-fen remaining being at Wicken in Cambridgeshire.

The remaining division, the 6th, or 'Enclosed,' district, comprises the central portion of the county extending from Norwich to the boundary of the 'Breck,' and from the Suffolk border in the south, northward to the sea. This area includes the most highly cultivated portion of the county, and is, as a rule, well timbered and divided into small enclosures by hedgerows; it abounds with the numerous species of birds usually frequenting highly cultivated lands, and, being a great game country, is as a rule strictly preserved.

The easterly position of the county of Norfolk, together with its extensive sea-board and the favoured retreats already alluded to, offer exceptional attractions to the great army of passing migrants which at certain seasons of the year perform their perilous journeys, and no part of the kingdom is more favourably situated for the observation of these periodic movements. The autumnal advent is thus described by Mr. Gurney:— 'The vast army is heralded by the arrival in September of redstarts, wheatears, pied flycatchers, whitethroats, nightjars, little stints, pigmy curlews, etc.; but when October sets in, the greatest influx takes place . . . Buzzards, and other birds of prey, soar aloft in circles, while the eye which knows her flight will catch the distant peregrine falcon, or more frequently the kestrel or merlin. Short-eared owls are discovered in flocks of fifteen or twenty; and the gamekeeper, going his morning rounds, finds that long before he was up there had been an early arrival of jays and sparrow-hawks. Straggling parties of grey crows, jackdaws, and rooks dot the air for days together, while snow-buntings and flocks of chaffinches appear in the fields nearest to the sea. Bramblings, twites, siskins, shore-larks and mealy redpolls are heard of at our birdcatchers', snipe and plovers are seen on the marshes. Sky-larks come over in clouds, and, mingled with them, are regiments of starlings flying westward with steady purpose. The woodcock, tired with the long flight from Norway, halts to rest after his nocturnal journey in the first plantation he reaches, or drops among the sandhills. The fieldfare and redwing appear, and the number of song-thrushes and blackbirds in the

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turnip fields near the coast is often perfectly amazing. But when November draws to a close, the rush of land birds is over, though a few small flocks of grey crows, woodcock and sky-larks come dropping in for many weeks afterwards.¹ This 'east to west' autumnal immigration, to which we owe the wonderful influx of rare species from central Europe, and even from the trans-Caspian, which visit us, and these sudden 'rushes,' form one of the most remarkable phenomena in the whole range of natural science. The nature of the impulse which initiates the movement, and the instinct (?) which guides it, are still as little understood as ever, but much light has been thrown upon the route pursued, and the circumstances under which the journey is undertaken, by the investigations carried out by the Migration Committee of the British Association as interpreted by Mr. Eagle Clarke,² and the tangible results are the number of rare species which they have brought us, among which may be enumerated the barred warbler, icterine warbler, blue-throated and aquatic warblers, the great-spotted cuckoo, Pallas's warbler, red-breasted flycatcher, and many others, all of which we owe to these autumnal flights.

Decoys were numerous in Norfolk early in the present century, and an interesting account of their working and construction will be found in Lubbock's *Fauna of Norfolk*, edit. ii., pp. 134, 220; also in the *Transactions of the Norfolk and Norwich Naturalists' Society*, vol. ii. p. 538. There are several decoys in the county still worked in an amateur way, but I believe the only one now systematically carried on for profit is that on Fritton Lake, belonging to Sir Savile Crossley. Here in the past season (October, 1899, to February, 1900, inclusive), which has been a very favourable one, 2,685 ducks and mallard, 21 teal, 13 wigeon, and 2 pintails have been taken. Very few teal are taken here now, and the season ends too early for the spring migration of wigeon; one or two pintails are generally taken, and an occasional goosander; coots also sometimes figure in the returns; but I think this is merely owing to the accident of their being in the pipe at the time the fowl are driven up.

If the county of Norfolk is the possessor of an exceptionally rich avi-fauna, it is equally fortunate in having produced a long line of naturalists, who have left most valuable information for the benefit of their successors. The first glimpse of Norfolk ornithology is obtained in the *L'Estrange Household Book* as early as the year 1519. Some hundred and fifty years later follows Sir Thomas Browne's *Account of Birds found in Norfolk*, written about the year 1663 (not published till 1835), which for accuracy and shrewdness of observation has never been surpassed. A long period intervened, and in 1826 appeared Sheppard and Whitear's *Catalogue of Norfolk and Suffolk Birds*, followed in 1829 by *A List of Birds found in Norfolk*, by John Hunt, the author of an illustrated British Ornithology, never completed; a *Sketch of the Natural History of Yarmouth*, by C. J. and James Paget, in 1834; *Observations on the Fauna of*

¹ Gurney and Southwell, *Trans. Norf. and Nor. Nat. Soc.*, iv. p. 262.

² See *Report British Association* (Liverpool Meeting), 1896, pp. 451-477.

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Norfolk, a charming book by the Rev. Richard Lubbock, in 1845 (a second edition in 1879); *An Account of the Birds found in Norfolk*, by J. H. Gurney and W. R. Fisher, published in the *Zoologist* in 1846; and last, but by far the most important, Mr. Stevenson's *Birds of Norfolk*, consisting of a series of monographs of the birds found in Norfolk, as instructive as they are interesting. The pages of the *Zoologist*, too, are an epitome of Norfolk ornithology from the commencement of that periodical in 1843 to the present time. All these will be referred to in what follows; but there are a host of names of ardent naturalists and sportsmen whose only share in the literature of the subject is the valuable assistance they so liberally contributed to the productions of others.

Of the 308¹ fully recognized species in the list which follows, 107 may be regarded as regular breeders in this county; 12 as occasional breeders, viz. :—

Crossbill	Garganey Teal
Hooded Crow	Spotted Crake
Short-eared Owl	Baillon's Crake
Marsh-Harrier	Ruff (?)
Hobby (?)	Common Sandpiper
Little Bittern (?)	Roseate Tern (?)

Of these the hobby, ruff, and little bittern, which were once regular breeders, if they have not already ceased to do so are probably on the verge of extinction, and the roseate tern has only recently been observed under conditions which render its nesting here highly probable. There is more or less reason to believe that twelve other species have on rare occasions bred in the county, viz. :—

Ring-Ousel (?)	Wigeon (?)
White Wagtail	Pintail (?)
Rock-Pipit (?)	Green Sandpiper
Golden Oriole	Wood-Sandpiper
Woodchat (?)	Curlew
Pied Flycatcher	Sandwich Tern

And fifteen others, which formerly bred in Norfolk, are now believed to have ceased to do so, viz.—

Savi's Warbler	Grey Lag-Goose
Raven	Black Grouse (?)
Hen-Harrier	Crane ²
Kite	Great Bustard
Peregrine Falcon	Avocet
Cormorant	Black-tailed Godwit
Bittern	Black Tern
Spoonbill	

¹ Or 309 if the gyr-falcon be included.

² There is an entry in the Chamberlain's accounts of the city of Norwich of a payment of v^s to 'Notyngham of Hyklyng for a yong pyper crane' and iiij^d for the carriage of the same to Norwich under date of the year 1543, which conclusively proves that the crane nested at Hickling, a most likely situation, in that year.

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leaving 162 non-breeding species, for the most part winter immigrants or casual visitors.

There are also 22 other birds which, although mentioned in the list, are not included in the number of recognized species, for the reasons either that their specific value is not universally acknowledged, or their claims to have occurred in this county are in some way not satisfactorily established, viz. :—

Grey-headed Yellow Wagtail
Pallas's Great Grey Shrike
Holboell's Redpoll
Russian Bullfinch (*P. major*)
Red-barred Crossbill
Eagle-Owl
Pelican¹
Great White Heron
Little Egret
Buff-backed Heron
Canada Goose

Egyptian Goose
Harlequin-Duck
Hooded Merganser
Rock-Dove
Virginian Colin
Green-backed Gallinule
Cream-coloured Courser
Eastern Golden Plover
Sabine's Snipe
Wilson's Petrel
Ringed Guillemot

But for the absence of Mr. J. H. Gurney from England, I should have had the advantage of being associated with him in the preparation of the list which follows ; but he has generously allowed me to make use of the information contained in a previous joint list of the same kind, and has read the proofs before they were finally settled.

1. Missel-Thrush. *Turdus viscivorus*, Linn.
A common resident.

2. Song-Thrush. *Turdus musicus*, Linn.
Common, and generally distributed in the summer months ; like many others of our summer residents, it is a partial migrant, the local race passing south, and their places being taken by immigrants, which sometimes are very numerous.

3. Redwing. *Turdus iliacus*, Linn. } Common
4. Fieldfare. *Turdus pilaris*, Linn. } winter
immigrants.

5. White's Thrush. *Turdus varius*, Pallas.
Is a rare accidental visitor, it has only

occurred once, on October 10th, 1871, at Hickling.

6. Blackbird. *Turdus merula*, Linn.
The same remarks apply to this species as to the thrush.

7. Ring-Ousel. *Turdus torquatus*, Linn.
The ring-ousel is rather an uncommon spring and autumn visitor ; it is suspected to have nested in Norfolk on a few occasions.

8. Wheatear. *Saxicola ænanthe* (Linn.). } Regular summer migrants,
9. Whinchat. *Pratincola rubetra* (Linn.). } breeding in Norfolk.

¹ There is good reason to believe that a species of pelican in times past was an inhabitant of the fens of East Anglia. Bones of a bird of this genus, believed from their large size to belong to *P. crispus*, a native at present of southern Europe, have on two occasions been found in the Cambridgeshire fens, and once in Feltwell Fen, Norfolk, part of the same 'level.' In one of the Cambridgeshire instances the bones were those of so young an individual as to indicate that the species was probably a native of the locality and not a mere casual visitor to this and other suitable localities in England. This assumption is rendered the more probable from the discovery of the bones of pelicans, apparently of the same species, in the remains of an ancient lake dwelling near Glastonbury, Somersetshire (*Ibis*, 1899, p. 353). Sir Thomas Browne makes allusion to a pelican shot on Horsey Broad on May 22nd, 1663 ; but with his usual cautiousness adds that it may have escaped from St. James's, as he heard that one of the king's pelicans was lost about the same time. However that might have been there is no doubt that the broads at that time were extensive enough to attract any rare water-bird that chanced to find its way to our coast, and the month of May is just that in which this southern species would be likely to occur.

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10. Stonechat. *Pratincola rubicola* (Linn.).

This is a common resident in suitable localities.

11. Redstart. *Ruticilla phænricurus* (Linn.).

A common summer migrant.

12. Black Redstart. *Ruticilla titys* (Scopoli).

A winter visitant, probably occurring annually.

13. Red-spotted Bluethroat. *Cyanecula suecica* (Linn.).

The northern form of bluethroat, which was first detected at Yarmouth in September, 1841, has frequently been obtained in Norfolk since that time. It appears on the coast as an autumn migrant occasionally in considerable numbers, as in September, 1884, when at least 80 were seen at Cley.

14. Redbreast. *Erethacus rubecula* (Linn.).

Common resident and partial migrant.

15. Nightingale. *Daulias luscina* (Linn.).

A summer migrant, frequent in the neighbourhood of Norwich, but somewhat local.

16. Whitethroat. *Sylvia cinerea* (Bechstein).

A common summer visitant.

17. Lesser Whitethroat. *Sylvia curruca* (Linn.).

Also a summer migrant, but local and scarce compared with the preceding species.

18. Blackcap. *Sylvia atricapilla* (Linn.).

A not uncommon summer migrant.

19. Garden-Warbler. *Sylvia hortensis* (Bechstein).

Also a common migrant, more local, and not so frequent as the blackcap.

20. Barred Warbler. *Sylvia nisoria* (Bechstein).

Four examples of this straggler from the continent have now been killed, and a fifth watched for a considerable time by Mr. Gurney, all at Blakeney Point on the Norfolk coast.

21. Dartford Warbler. *Sylvia undata* (Boddaert).

This unobtrusive little bird is met with on the furze-covered heaths on the borders of Norfolk and Suffolk, where it breeds in small numbers.

22. Goldcrest. *Regulus cristatus*, Koch.

This species is generally distributed in summer, and receives enormous additions to

its numbers during the autumnal migration. Some of these remain with us, but the bulk, as is probably the case with most of our home-bred birds, pass on to the south.

23. Firecrest. *Regulus ignicapillus* (Brehm).

A very rare bird in Norfolk, most of the recorded instances undoubtedly refer to the preceding species. Mr. Gunn received a male in the flesh from Attlebridge in November, 1879.

24. Yellow-browed Warbler. *Phylloscopus superciliosus* (Gmelin).

An example of this charming little Asiatic species was killed at Cley-next-the-Sea on October 1st, 1894. Full particulars of the occurrence will be found in *The Field* for November 3rd, 1894, also in the *Zoologist*, 1895, p. 100.

25. Pallas's Warbler. *Phylloscopus proregulus* (Pallas).

This bird is another addition to the rare wanderers which the autumnal migratory stream has brought to the prolific locality of Cley-next-the-Sea and Blakeney; it was killed at the former place on October 31st, 1896. Full particulars of the event will be found in the volume of the *Zoologist* for 1896, p. 466, and in the *Trans. of the Norf. and Nor. Nat. Soc.* (with coloured plate), vol. vi. p. 280.

26. Chiffchaff. *Phylloscopus rufus* (Bechstein).

A summer visitant, not uncommon, but somewhat local.

27. Willow-Warbler. *Phylloscopus trochilus* (Linn.).

A common summer visitant. Largely represented at the periods of migration.

28. Wood-Warbler. *Phylloscopus sibilatrix* (Bechstein).

A summer visitant, but very local.

29. Icterine Warbler. *Hypolais icterina* (Vieillot).

This bird has been thrice obtained at Blakeney Point during the autumn migration, the last on September 5th, 1898.

30. Reed-Warbler. *Acrocephalus streperus* (Vieillot).

Generally an abundant summer visitant in suitable localities, but rather uncertain.

31. Sedge-Warbler. *Acrocephalus phragmitis* (Bechstein).

Common in summer in suitable localities.

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32. Aquatic Warbler. *Acrocephalus aquaticus* (Gmelin).

Although there was reason to believe that the aquatic warbler had occurred in Norfolk previously, it was not confirmed till September, 1896, when a specimen was killed at Blakeney by Mr. T. E. Gunn.

33. Grasshopper-Warbler. *Locustella nævia* (Boddaert).

A summer visitant, local, and by no means numerous. Most frequently met with near the broads.

34. Savi's Warbler. *Locustella luscinioides* (Savi).

Six of these birds (four of which are in the Norwich Castle Museum) have been killed within a radius of about as many miles near Norwich, including the first and last specimens obtained in England. The late Mr. Newcome had a nest from 'the neighbourhood of Yarmouth,' and a nest with four eggs was taken at 'Poppelot,' part of Feltwell Fen, in 1848.

35. Hedge-Sparrow. *Accentor modularis* (Linn.).

Common.

36. Common Dipper or Water-Ousel. *Cinclus aquaticus*, Bechstein.

Not more than three specimens of the chestnut-breasted dipper have been met with in Norfolk that I am aware of.

37. Black-bellied Dipper. *Cinclus melanogaster*, Brehm.

This dipper is not of rare occurrence in Norfolk, generally appears in the month of November; almost all the dippers met with here being of the Scandinavian race.

38. Bearded Reedling. *Panurus biarmicus* (Linn.).

Although in greatly reduced numbers, the bearded reedling is still found nesting in the Norfolk broads, which probably form its last summer resort in England. I have not heard of its nesting elsewhere, but it has been seen in the present winter in certainly two other localities.

39. Long-tailed Tit. *Acredula caudata* (Linn.).

A common resident.

40. Great Tit. *Parus major*, Linn.

Universally distributed, and receives mi-

gratory accessions to its numbers in the autumn.

41. Continental Coal-Tit. *Parus ater*, Linn.

This form, whether or not specifically distinct from that which follows, has certainly been killed in Norfolk in at least two instances.

42. British Coal-Tit. *Parus britannicus*, Sharpe and Dresser.

A common resident.

- | | |
|---|--|
| 43. Marsh-Tit. <i>Parus palustris</i> , Linn. | } Both common and generally distributed. |
| 44. Blue Tit. <i>Parus cæruleus</i> , Linn. | |

45. Nuthatch. *Sitta cæsia*, Wolf.

Common, and generally distributed.

46. Wren. *Troglodytes parvulus*, Koch.

The wren is a common resident, receiving migratory accessions in the autumn.

47. Tree-Creeper. *Certhia familiaris*, Linn.

A common and generally distributed resident.

48. Wall-Creeper. *Tichodroma muraria* (Linn.).

This species is placed in square brackets as doubtful in the *Ibis* list, but there is not the slightest reason to question the accuracy of the romantic account of the occurrence of this bird at Stratton Strawless in 1792, as communicated by Robert Marsham, F.R.S., to Gilbert White (cf. *Trans. Norf. and Nor. Nat. Soc.*, ii. 188) accompanied by a drawing of two of the wing feathers, in acknowledging the receipt of which he says: 'You will have the satisfaction of introducing a new bird of which future Ornithologists will say,—"found at Stratton Strawless in Norfolk by that painful and accurate Naturalist, Robert Marsham, Esq."'-and pays a courtly compliment to the 'fair unknown, whose soft hand has given the specimen a truly delicate and feathery appearance.' Other occurrences are recorded by Mr. Saunders in his *Manual*, ed. 2, p. 119.

49. Pied Wagtail. *Motacilla lugubris*, Temminck.

Common in summer, but the greater number leave us for a short time in midwinter.

50. White Wagtail. *Motacilla alba*, Linn.

An occasional visitor to Norfolk. It is believed in three instances to have paired and bred with the pied wagtail.

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51. Grey Wagtail. *Motacilla melanope*, Pallas.

Not a common bird in Norfolk, but shows a preference to some few favoured localities.

52. Blue-headed Yellow Wagtail. *Motacilla flava*, Linn.

This species has been killed in a few instances in Norfolk in the spring, but can only be regarded as a straggler.

M. cinereicapilla, Savi, the Mediterranean variety, with grey crown and very little eye-streak, has been recorded for Norfolk (Gurney, *Trans. Norf. and Nor. Nat. Soc.*, ii. p. 226). Whether this is deserving of specific rank or not, Mr. Gurney points out that an example, now in the possession of Mr. F. Boynton, precisely similar to his bird, was killed at Brighton in 1867.

53. Yellow Wagtail. *Motacilla raii* (Bonaparte).

Generally distributed in summer in the marshy districts of the county.

54. Tree-Pipit. *Anthus trivialis* (Linn.).

A summer migrant in the wooded districts.

55. Meadow-Pipit. *Anthus pratensis* (Linn.).

A common resident, receiving additions in autumn.

56. Tawny Pipit. *Anthus campestris* (Linn.).

A female was taken in a clap-net at Yarmouth on October 7th, 1897; it has also occurred at Lowestoft.

57. Richard's Pipit. *Anthus richardi*, Vieillot.

Richard's pipit has been taken near Yarmouth four times in winter and twice in spring.

58. Rock-Pipit. *Anthus obscurus* (Latham).

This species is not uncommon on the coast, more particularly in the autumn. It is suspected of having bred at Blakeney in 1880.¹

59. Scandinavian Rock-Pipit. *Anthus rupes- tris*, Nilsson.

The Scandinavian rock-pipit has been several times shot in Norfolk in the months of February and March.

60. Golden Oriole. *Oriolus galbula*, Linn.

This beautiful bird is a very rare summer visitor to Norfolk. There is reason to believe, however, that it has nested in this county more than once.

¹ F. D. Power, *Trans. Norf. and Nor. Nat. Soc.*, iii. p. 346.

61. Great Grey Shrike. *Lanius excubitor*, Linn.

An occasional visitor, generally in autumn. The variety with a single alar bar known as *L. major*, Pallas's grey shrike, is not an infrequent visitor during autumn and winter, perhaps the more frequent of the two.

62. Lesser Grey Shrike. *Lanius minor*, Gmelin.

Has been met with only twice in Norfolk, in both instances near Yarmouth and both in the spring time, first in 1869 and again in 1875.

63. Red-backed Shrike or Butcher-Bird. *Lanius collurio*, Linn.

A summer migrant, not so frequent as formerly.

64. Woodchat. *Lanius pomeranus*, Sparrman.

Hunt, in his *List of Norfolk Birds* states that Mr. Scales (of Beechamwell) assured him he had killed this rare species in the neighbourhood of Beechamwell, where he has known it to breed and rear its young. But for the fact that both Scales and Hunt were excellent observers, one would be inclined to regard this statement with doubt; it seems to be in some degree corroborated by the statement of J. D. Hoy (*Mag. Nat. Hist.* iv., 343) to the effect that one killed near Swaffham, which is in the neighbourhood of Beechamwell, was in the collection of the Rev. Robert Hamond.¹ Hoy's communication is dated March 16th, 1831. The specimen, also mentioned by Hoy, as killed by Mr. Adams 'of Gorleston, Norfolk,' is stated by Messrs. Paget to have been killed by that gentleman at Bradwell, Suffolk, in April, 1829. Selby (*Brit. Orn.*, i. 153) mentions one as having been seen, but not shot, by Rev. R. Hamond, some time before 1833. Mr. Gurney has one in his collection, killed near Yarmouth, in April, 1859, and another was procured at the same place in 1885.

65. Waxwing. *Ampelis garrulus*, Linn.

An accidental winter visitor, occasionally arriving in considerable numbers, but very uncertain.

66. Pied Flycatcher. *Muscicapa atricapilla*, Linn.

A somewhat rare spring and autumn migrant, believed to have occasionally nested here.

¹ There are three woodchats at present in the Hamond collection, all of which may be of local origin.

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67. Spotted Flycatcher. *Muscicapa grisola*, Linn.

Locally, Wall or Beam-bird.

This is a late summer visitor, plentifully distributed.

68. Red-breasted Flycatcher. *Muscicapa parva*, Bechstein.

This is another of the rare migrants first obtained at Cley. Altogether four examples have been seen or obtained, three of these at Cley.

69. Swallow. *Hirundo rustica*, Linn.

70. House - Martin. *Chelidon urbica* (Linn.)

71. Sand-Martin. *Cotile riparia* (Linn.)

All
common
summer
migrants.

72. Greenfinch. *Ligurinus chloris* (Linn.).

Very common in Norfolk; its numbers are increased by autumn immigrants.

73. Hawfinch. *Coccothraustes vulgaris*, Pallas.

This bird is apparently much more frequent in Norfolk than formerly. It breeds here, and in the autumn is sometimes met with in considerable numbers.

74. Goldfinch. *Carduelis elegans*, Stephens.
Locally, King Harry.

The goldfinch is not so numerous as formerly, owing probably to the persistent persecution to which it is subjected by bird-catchers, and to some extent also to improved cultivation and the enclosure of waste places.

75. Siskin. *Carduelis spinus* (Linn.).

A visitor in uncertain numbers in the autumn, usually departing very early in the new year.

76. Serin Finch. *Serinus hortulanus*, Koch.

This finch has been obtained twice in Norfolk, in each instance near Yarmouth.

77. House-Sparrow. *Passer domesticus* (Linn.).

In Norfolk as elsewhere quite sufficiently numerous.

78. Tree-Sparrow. *Passer montanus* (Linn.).

The tree-sparrow is either more numerous or better known in this county than formerly, but is still somewhat local. Additions are made to the resident birds by immigrants in autumn.

79. Chaffinch. *Fringilla cœlebs*, Linn.

This is certainly one of the best known birds in Norfolk, receiving large accessions to its numbers in the form of autumn migrants.

80. Brambling. *Fringilla montifringilla*, Linn.

A winter visitor in varying and uncertain numbers. A curious variety with a black chin has been taken several times.

81. Linnet. *Linota cannabina* (Linn.).

Another of our common species which is a partial migrant and receives large accessions to its numbers in autumn, these however soon pass on.

82. Mealy Redpoll. *Linota linaria* (Linn.).

The mealy redpoll is with us a winter visitant in very uncertain numbers.

Dr. Sharpe states in the *B. M. Catalogue of Birds* (xii. p. 251) that two specimens of Holboell's redpoll taken near Norwich, are in the Natural History Museum.

83. Lesser Redpoll. *Linota rufescens*, Vieillot.

A resident in Norfolk, but not numerous; in autumn large flocks frequently make their appearance.

84. Twite. *Linota flavirostris* (Linn.).

The twite, or French linnet, as it is sometimes called here, is a regular winter visitant in varying numbers.

85. Bullfinch. *Pyrrhula europæa*, Vieillot.

This is rather a local bird here, but not uncommon.

A male of the Russian bullfinch (*P. major*, Brehm) was shot on the Yarmouth Denes in January, 1893.

86. Scarlet Bullfinch or Scarlet Grosbeak. *Pyrrhula erythrina* (Pallas).

A female was caught on the North Denes, Yarmouth, on September 2nd, 1892 (cf. *Zoologist*, 1892, p. 401, and 1893, p. 150).

87. Crossbill. *Loxia curvirostra*, Linn.

Small flocks of this bird are occasionally seen, but it is a very uncertain visitant. Miss Anna Gurney, in her *Nat. Hist. Notes*, mentions a nest found at Sherringham, Norfolk, in April, 1829. Mr. Norgate first found it nesting on the Suffolk side of the boundary in 1885, and Lord Lilford believes it to have bred in west Norfolk several times prior to that year. Subsequently Mr. Norgate found this species nesting freely on the Norfolk and Suffolk border on several occasions.

Mr. Gurney records the occurrence of an example of the red-barred crossbill, *L. rubrifasciata* of Brehm, at Westwick, on September 28th, 1871 (*Zoologist*, 1889, p. 391).

88. Parrot-Crossbill. *Loxia pityopsittacus*, Bechstein.

Professor Newton has recorded a male

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killed at Riddlesworth prior to 1851 (*Zoologist*, 1851, p. 3145), and two were killed near Norwich in May, 1888.

89. Two-barred Crossbill. *Loxia bifasciata* (Brehm).

A specimen was shot on September 1st, 1889, at Burgh, near Great Yarmouth. This locality, although within the geographical boundary of Suffolk, may be fairly claimed as part of Norfolk for ornithological purposes, as it is situated on a tongue of land running far up into the latter county.

90. White-winged Crossbill. *Loxia leucoptera*, Gmelin.

A bird of this species was taken alive on the rigging of a ship which arrived in Yarmouth on October 9th, 1872, and lived two years in Mr. Stevenson's aviary at Norwich.

91. Corn-Bunting. *Emberiza miliaria*, Linn.
Resident and fairly abundant.

92. Yellow Hammer. *Emberiza citrinella*, Linn.
Locally, Gooley.

A very common resident.

93. Cirl Bunting. *Emberiza cirlus*, Linn.

Is said to have occurred in 1849, and again in 1855. Mr. Booth obtained two at Hickling in 1875, and two others were netted on Breydon Marshes on January 29th, 1888.

94. Ortolan Bunting. *Emberiza hortulana*, Linn.

This bird has been obtained at Cley three times in the month of September, all immature.

95. Reed-Bunting or Black-headed Bunting. *Emberiza schœniclus*, Linn.

A resident, and common in suitable localities.

96. Snow-Bunting. *Plectrophanes nivalis* (Linn.).

This is a regular winter visitor in greater or less numbers to the sea coast.

97. Lapland Bunting. *Calcarius lapponicus* (Linn.).

The Lapland bunting had occurred in a few instances in Norfolk previous to 1892, in which year there was a remarkable irruption of this species on our coast in the months of October and November, not less than fifty-six were netted or shot. In the autumn of 1893 they again visited us, but in much fewer numbers.

98. Starling. *Sturnus vulgaris*, Linn.

A very common resident, receiving large accessions to its numbers in autumn.

The second recorded British specimen of the American red-winged starling (*Agelæus phœniceus*) was killed on Barton Broad in June, 1843, but its origin is doubtful. An American meadow-starling (*Sturnella magna*) is also said to have been seen by Captain Jary, at South Walsham in October, 1854; and one was certainly killed in Suffolk in March of 1860, but in both cases their origin appears doubtful.

99. Rose-coloured Pastor. *Pastor roseus* (Linn.).

This bird has been recorded for Norfolk (Edwards, *Nat. Hist. of Birds*, iv. p. 222) as long ago as the year 1747, since which time many others have been met with, but none very recently.

100. Nutcracker. *Nucifraga caryocatactes* (Linn.).

This bird has been shot in Norfolk in October, 1884 and 1853, and again in November, 1888.

101. Jay. *Garrulus glandarius* (Linn.).

The jay is still a common bird here, but every man's hand is against it.

102. Magpie. *Pica rustica* (Scopoli).

The magpie like the jay is dreadfully persecuted here by game preservers; it is seldom seen in west Norfolk, but a few are found in the northern division of the county. A few immigrants probably arrive in autumn.

103. Jackdaw. *Corvus monedula*, Linn.

Frequent.

104. Raven. *Corvus corax*, Linn.

The raven formerly nested in Norfolk, but has not done so, that I am aware of, since the year 1859, when a nest was taken at Beechamwell. Sir Thomas Browne says that in his time the raven was 'in good plentie about the citty [of Norwich] wch makes so few kites to bee seen hereabout.' In the present day it must be regarded as a very rare immigrant.

105. Carrion-Crow. *Corvus corone*, Linn.

This bird, although rather local, breeds in several parts of the county, and is of more frequent occurrence than some of its enemies imagine. In the spring it visits us as an immigrant, arriving generally in pairs.

106. Hooded or Grey Crow. *Corvus cornix*, Linn.

An abundant winter visitant, leaving us in

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March ; but a few pairs have been known to remain and breed in the county.

107. Rook. *Corvus frugilegus*, Linn.

This is an abundant resident and a regular autumn visitor, generally arriving by daylight. The strangers depart in March ; at all times highly gregarious.

108. Sky-Lark. *Alauda arvensis*, Linn.

Always a common bird, but receives large accessions to its numbers in autumn.

109. Wood-Lark. *Alauda arborea*, Linn.

This is not an uncommon bird in some localities in summer, chiefly in south-west Norfolk ; it also sometimes occurs as a winter visitor.

110. Short-toed Lark. *Alauda brachydactyla*, Leisler.

A short-toed lark is said to have been shot on November 7th, 1889, on the Breydon Marshes, near Yarmouth [*Zoologist*, 1890, p. 394].

111. Shore-Lark. *Otocorys alpestris* (Linn.).

The shore-lark is one of those species which appear to be extending their range to the westward. It was a few years ago regarded as a rare bird here, but now occurs regularly every autumn, sometimes in considerable numbers.

112. Swift. *Cypselus apus* (Linn.).

The swift is a numerous summer visitor, considerable numbers nest in the chalk cliffs at Hunstanton.

113. Alpine or White-bellied Swift. *Cypselus melba* (Linn.).

This swift has been killed at Old Buckenham and at Yarmouth, and two others are said to have been seen in Norfolk.

114. Nightjar or Goat-sucker. *Caprimulgus europæus*, Linn.

This is a rather common late summer visitant with us.

115. Wryneck. *Ijnx torquilla*, Linn.

A common summer migrant with us, but rather partial in its choice of a locality.

116. Green Woodpecker. *Gecinus viridis* (Linn.).

This bird is fairly abundant in Norfolk, notwithstanding the insane practice of shooting them wherever met with, which often fills our bird-stuffers' workrooms.

117. Great Spotted Woodpecker. *Dendrocopus major* (Linn.).

A resident here, which breeds in limited

numbers. In autumn rather large numbers occasionally visit us.

118. Lesser Spotted Woodpecker. *Dendrocopus minor* (Linn.).

Like the above this is a resident with us, but in smaller numbers, although apparently more frequent than formerly. It is probable that this species also receives some accession to its numbers in autumn.

119. Kingfisher. *Alcedo ispida*, Linn.

It is marvellous how the kingfisher maintains its numbers as a resident, seeing the ruthless way in which it is shot whenever opportunity occurs. Considerable numbers come to us in the autumn.

120. Roller. *Coracias garrulus*, Linn.

Probably not a roller that ventures to land upon our coast escapes with its life. It has been killed between 1664 and the present time in some nineteen instances, but in only one case has it had time to get far from the coast. Most of the Norfolk examples have been females.

121. Bee-Eater. *Merops apiaster*, Linn.

Norfolk produced the first British-killed bee-eater in June, 1793, when two were shot at Mattishall.¹ Since that time eight others have been met with.

122. Hoopoe. *Upupa epops*, Linn.

A spring and autumn migrant, not of frequent occurrence, and apparently less often met with than formerly. Mr. Gurney had a wing from the Hasbrough light-ship in April, 1884. I have notes of others in 1885, 1886, 1888, 1890, 1892 and 1899.

123. Cuckoo. *Cuculus canorus*, Linn.

This summer visitor is too well known to need any remarks. It is perhaps more abundant in the neighbourhood of the broads than elsewhere.

124. Great Spotted Cuckoo. *Coccystes glandarius* (Linn.).

The great spotted cuckoo has been met with on only one occasion in Norfolk. In October, 1896, a young male was shot on Caister Denes, near Yarmouth.

125. Barn or White Owl. *Strix flammea*, Linn.

This owl, in spite of persecution, still survives to repay its persecutors with nothing but benefits. The dark form, believed to be of Scandinavian origin, is occasionally found

¹ See Sowerby's *Brit. Miscel.*, vol. ii. p. 17, Aug., 1806.

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among those which visit us in autumn. A good example of this race, killed near Norwich in December, 1864, is in the Castle Museum.

126. Long-eared Owl. *Asio otus* (Linn.).

A resident in summer; the bulk of our home birds go south in autumn, when their places are filled by immigrants.

127. Short-eared Owl. *Asio accipitrinus* (Pallas).

A nest or two of the short-eared owl is generally found in certain localities in Norfolk, where it formerly bred freely, but it is now chiefly known as an autumn migrant, sometimes arriving in considerable numbers about the same time as the woodcock, hence it is often called the 'woodcock owl.'

128. Tawny or Wood-Owl. *Syrnium aluco* (Linn.).

Generally distributed in suitable localities, but is less frequent than formerly.

129. Tengmalm's Owl. *Nyctala tengmalmi* (Gmelin).

Tengmalm's owl has been killed or taken alive three times in Norfolk.

130. Little Owl. *Athene noctua* (Scopoli).

Specimens have been obtained in Norfolk in a few instances previous to the year 1876. These are all presumably genuine occurrences; but on the date mentioned six were liberated in the woods at Kimberley, rendering subsequent examples doubtful.

131. Snowy Owl. *Nyctea scandiaca* (Linn.).

This fine owl has been met with in nine instances in Norfolk, of course always in winter.

132. Scops-Owl. *Scops giu* (Scopoli).

This rare little owl has been recorded nine times, but it is probable the only reliable instances are as follows: one at Cromer in November, 1861; a second at Walsingham in May, 1891; and a third near Holt in November, 1892.

[Eagle-owl. *Bubo ignavus*, T. Forster.

A specimen was killed at Somerton in 1863 or 1864, but may possibly have been an escape.]

133. Marsh - Harrier. *Circus æruginosus* (Linn.).

Locally, Moor-Buzzard.

This is now a rare bird. Its last abiding-place is in the rough herbage surrounding some of the broads, where a pair or two generally make an unsuccessful attempt to

rear a brood, birds and eggs or young in most cases meeting with an untimely end. It is difficult to imagine how greatly these birds abounded both in the broads and in the fens of west Norfolk at the beginning of the century. Mr. Lubbock, writing in 1845, says that all the wounded birds fell to the share of the moor-buzzard, and calls it 'the *genus loci*—the sovereign of the place.' In the spring of 1818 nine were trapped at a single duck's nest. In Feltwell Fen, on the other side of the county, they seem to have been even more numerous; but in this latter locality buzzards and fen alike are things of the past.

134. Hen-Harrier. *Circus cyaneus* (Linn.).

This probably never was so numerous as the next species; it certainly is not so now, and those which visit us are mostly migrants. It does not seem so partial to the broads as Montagu's harrier, and perhaps some of the nests attributed to this bird may have belonged to the latter species.

135. Montagu's Harrier. *Circus cineraceus* (Montagu).

In the palmy days of the harriers all alike were known as buzzards, and this species was not distinguished from the preceding, but it certainly was by far the most numerous. At present scarcely a year passes without one or more nests being found in its old haunts, but it is probable that few birds escape, and still fewer succeed in rearing a brood.

136. Common Buzzard. *Buteo vulgaris*, Leach.

A spring and autumn visitor with us, though perhaps not quite so regular in its appearance of late years as formerly, but like all the birds of prey it is rare in adult plumage.

137. Rough-legged Buzzard. *Archibuteo lagopus* (Gmelin).

This buzzard visits us in autumn, sometimes in considerable numbers, seldom in adult plumage.

138. Golden Eagle. *Aquila chrysaëtus* (Linn.).

The golden eagle has never been met with alive in this county so far as is known, and our only claim to it as a Norfolk bird rests upon a dead individual found in a marsh at Stiffkey, in November, 1868.

139. White-tailed Eagle. *Haliaëtus albicilla* (Linn.).

This is a rather frequent autumn or winter visitor, but has not hitherto been killed here in adult plumage.

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140. Goshawk. *Astur palumbarius* (Linn.).

The goshawk is one of our rarest falcons. Out of thirteen recorded examples only one has been procured in adult plumage.

141. Sparrow-Hawk. *Accipiter nisus* (Linn.).

Fairly common with us throughout the year. Those breeding with us go south in the winter, their places being taken by immigrants from abroad.

142. Kite. *Milvus icinus*, Savigny.

The kite was formerly a common resident in Norfolk, but is quite extinct as a native, those which occasionally occur here being immigrants. Mr. Gurney thinks the kite ceased to nest with us between the years 1830 and 1840.

143. Honey - Buzzard. *Pernis apivorus* (Linn.).

This is an uncertain autumn migrant, sometimes appearing in considerable numbers, as in the years 1881 and 1896.

144. Greenland Falcon. *Falco candicans*, Gmelin.

A Greenland falcon in the Norwich Museum was killed at Beeston near Cromer, in February, 1848. An earlier Norfolk-killed specimen of this beautiful bird is in the Saffron Walden Museum.

A young male falcon was killed at Thetford Warren in the spring of 1883, which passed into the collection of the late Dr. Churchill Babington, it was in a stage of plumage which rendered it extremely difficult to determine to which of the two closely allied species it belonged—the gyr falcon or the Iceland falcon—but although the two in this condition are almost indistinguishable opinion is in favour of the former.

145. Peregrine Falcon. *Falco peregrinus*, Tunstall.

This falcon is by no means uncommon as an autumn or winter migrant, often in adult plumage. This species bred in the chalk cliffs at Hunstanton till about the year 1821; other nesting places are mentioned by Mr. Lubbock (*Fauna of Norfolk*, edit. 2, p. 28).

146. Hobby. *Falco subbuteo*, Linn.

A summer visitor which perhaps still occasionally breeds here, but appears to have become much rarer of late years.

147. Merlin. *Falco æsalon*, Tunstall.

The merlin visits us in autumn, and is not uncommon in immature plumage.

148. Red-footed Falcon. *Falco vespertinus*, Linn.

This falcon was first made known as a British bird in May, 1830, when five were killed in Norfolk. It has been twice met with here since that time.

149. Kestrel. *Falco tinnunculus*, Linn.

This is a common resident, receiving large additions to its numbers in autumn, when like so many of our breeding species the home-bred individuals leave us.

150. Osprey. *Pandion haliaëtus* (Linn.).

The osprey visits us in its spring and autumn migrations, when it seldom omits to put in an appearance.

151. Cormorant. *Phalacrocorax carbo* (Linn.).

Generally an autumn visitor and most commonly in the immature plumage, the adult being rare. It is sometimes seen on the broads and inland waters, and formerly bred at Reedham and in the woods at Herringfleet certainly as late as 1827 (*Fauna of Norfolk*, edit. 2, p. 174). When it deserted the Reedham nesting-place is not known, but Sir Thomas Browne says (circa 1663) that 'King Charles the First was wont to be supplied' from there.

152. Shag or Green Cormorant. *Phalacrocorax graculus* (Linn.).

Less frequently met with than the above, a few have been killed in fully adult plumage.

153. Gannet or Solan Goose. *Sula bassana* (Linn.).

The gannet is often seen fishing off our coast, generally in autumn, and specimens, mostly immature, are occasionally obtained ashore in rough weather.

Sir Thomas Browne alludes twice¹ to a pelican shot on Horsey Broad in May, 1663, which he suggests may have escaped from the King's collection in St. James's Park. Bones of a species of pelican have been found both in the fens of Norfolk and Cambridgeshire.²

154. Heron. *Ardea cinerea*, Linn.

A very common bird in Norfolk. Many may often be seen feeding together on the mud-flats at Breydon. A list of the Norfolk heronries is given in Lubbock's *Fauna of Norfolk* (edit. 2, pp. 85, 222). There is also a thriving colony at Kimberley. Lubbock mentions that nests were occasionally found

¹ Wilkin's Edit. i. p. 397, and iv. p. 318.

² See footnote p. 227 ante.

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amongst the reeds in the most inaccessible parts of the fen.

155. Purple Heron. *Ardea purpurea*, Linn.

The purple heron has been met with several times in Norfolk, but I believe always in immature plumage.

156. Squacco Heron. *Ardea ralloides*, Scopoli.

And adult male squacco heron was killed at Surlingham on June 26th, 1863. A few others have been recorded, all but one (of which the exact date was doubtful) in the summer months.

157. Night-Heron. *Nycticorax griseus* (Linn.).

The night-heron has been killed in Norfolk more than a dozen times, the last at Rollesby on November 8th, 1899.

Mr. Stevenson included the great white heron, little egret, and buff-backed heron in the *Birds of Norfolk* on what is now considered doubtful evidence.

158. Little Bittern. *Ardetta minuta* (Linn.).

This is an occasional visitant to the broads in summer, where there is no doubt it formerly bred, and there is strong presumptive evidence of its having done so on two occasions in recent years. On July 3rd, 1893, also two males in full plumage were shot at Rollesby, but no nest was found. It was also heard at Saham Toney in June, 1894, and again in July, 1896.

159. Bittern. *Botaurus stellaris* (Linn.).

This species was at the beginning of the century a very abundant inhabitant of the broads and fens of Norfolk, but must now be regarded as a somewhat frequent winter migrant, the past winter (1899-1900) having been unusually productive. It doubtless nested freely in suitable localities, and even now would probably do so if not molested, as it shows a disposition to stay late in spring. The last nest was found on March 30th, 1868, and a very young bird was caught alive on May 25th of the same year and in the same locality. The breeding 'boom' was heard in the last week in May, 1886, at Sutton Broad, and on August 10th a young female, with down still adhering to some of its feathers, was killed at Ludham, probably the offspring of the bird heard in the spring.

160. White Stork. *Ciconia alba*, Bechstein.

The white stork occurs in Norfolk as an occasional spring or autumn straggler. At least twenty-four instances are on record.

161. Black Stork. *Ciconia nigra* (Linn.).

The black stork is a very rare summer

visitant here. Not more than three occurrences have been recorded, the last on April 23rd, 1888.

162. Glossy Ibis. *Plegadis falcinellus* (Linn.).

This bird must be looked on as a rare straggler in Norfolk. Possibly it was more frequently met with in the past. Mr. Lubbock states, on the authority of his friend, Mr. Girdlestone, that forty years before the year 1824 these birds were not so scarce as at the time he wrote, and were known to the Lynn gunners as the 'black curlew.'

163. Spoonbill. *Platalea leucorodia*, Linn.

An annual summer visitant, especially to Breydon, where small flocks are seen every spring. Mr. Gurney estimates that in the twelve summers ending 1898, ninety-three spoonbills visited Breydon, and that, thanks to the watcher of the Protection Society, nearly all of them escaped. Six frequented the Breydon mud-flats for several days in May, 1899. Sir Thomas Browne says, 'they formerly built in the Hernery at Claxton and Reedham; and now at Trimley in Suffolk.'

164. Grey Lag-Goose. *Anser cinereus*, Meyer.

Formerly an inhabitant of the fens in the south-west part of the county, but is now only a rare and occasional winter visitor.

165. White-fronted Goose. *Anser albifrons* (Scopoli).

The white-fronted goose is by no means a common species here, and is of very uncertain occurrence.

166. Bean-Goose. *Anser segetum* (Gmelin).

This is also a winter visitor of uncertain appearance. Mr. Booth considers this the most abundant species on the east coast of Norfolk.

167. Pink-footed Goose. *Anser brachyrhynchus*, Baillon.

This goose is rare on the east coast of the county, but its headquarters are at Holkham, where large flocks frequent the marshes every winter.

168. Red-breasted Goose. *Bernicia ruficollis* (Pallas).

A bird of this species is said to have been killed at Halvergate in 1805; it was purchased and eaten by a Yarmouth naturalist, Mr. Lilly Wigg. The species is so well marked as hardly to be mistaken, and the occurrence of other specimens on the east coast renders the record probable.

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169. Barnacle-Goose. *Bernicla leucopsis* (Bechstein).

This goose is certainly rare with us, and seasons often pass without its being observed. Mr. Gurney considers it the rarest of our Norfolk geese.

The Canada and Egyptian geese are often met with at large, but are probably of domestic origin.

170. Brent Goose. *Bernicla brenta* (Pallas).

The brent is a hard-weather goose most frequent in the shores of the Wash, where in long-continued frosts sometimes large quantities assemble.

171. Whooper Swan. *Cygnus musicus*, Bechstein.

This is essentially a hard-weather swan; a few are generally met with every winter, but in long-continued severe weather they sometimes visit us in considerable numbers.

172. Bewick's Swan. *Cygnus bewicki*, Yarrell.

Bewick's swan is much rarer than the whooper, but occurs under much the same circumstances.

173. Mute Swan. *Cygnus olor* (Gmelin).

The mute swan so often occurs in an apparently wild state that it is not unlikely some of them may be genuine migrants.

174. Polish Swan. *Cygnus immutabilis*, Yarrell.

The so-called Polish swan has frequently occurred in apparently a perfectly wild state in this county, and the late Mr. Gurney has bred white cygnets from domesticated individuals.

175. Sheld-Duck. *Tadorna cornuta* (S. G. Gmelin).

Although in the early years of the century probably much more numerous with us, the sheld-duck still breeds in several favoured localities on the west and east coast of the county.

176. Ruddy Sheld-Duck. *Tadorna casarca* (Linn.).

This species has now been killed so frequently on the Norfolk coast, apparently quite in a state of nature, that it really seems to have established its claims to a place in this list.

177. Wild Duck or Mallard. *Anas boschas*, Linn.

A common species, generally distributed, and breeds with us. For an account of the

decoys of Norfolk, see *Trans. Norf. and Nor. Nat. Soc.*, ii. 538.

178. Gadwall. *Anas strepera*, Linn.

From an occasional migrant, by the turning down of some pinioned birds taken in Narford Decoy about the year 1850, this species has become perfectly naturalized and breeds freely in several localities, and apparently is extending its range.

179. Shoveler. *Spatula clypeata* (Linn.).

This bird is a regular winter migrant, and breeds with us in increasing numbers.

180. Pintail. *Dafla acuta* (Linn.).

This is not at all a common duck with us. It generally visits us in winter, but has been met with in May, June and July under circumstances which indicated that it might have bred here. (Booth, *Rough Notes*, pt. xiii.)

181. Teal. *Nettion crecca* (Linn.).

The teal is resident and still breeds with us, receiving large accessions to its numbers in the autumn, but like the preceding appears to be on the decline as a breeding species.

The 'bimaculated duck,' a hybrid between this species and the wigeon, is believed to have occurred in Norfolk in 1846 (cf. *Zoologist*, p. 1698, and 1848, p. 2026 with fig.).

182. Garganey. *Querquedula circia* (Linn.).

Until of late years the garganey nested regularly in certain localities of the broads district, where it was a constant summer visitor; but for the last few years the numbers have been on the decrease, its place seeming to be taken by the shoveler.

183. Wigeon. *Mareca penelope* (Linn.).

The wigeon is a common winter visitor. There is a late spring migration northward, and it has been seen in the summer months under circumstances which indicate the probability of its having nested here on more than one occasion.

184. Red-crested Pochard. *Netta rufina* (Pallas).

This species was first recognized as British from a specimen killed at Yarmouth in July, 1818; since that time eight others have been obtained.

185. Pochard. *Fuligula ferina* (Linn.).

The pochard is a common winter duck, and breeds in south-west Norfolk.

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186. White-eyed or Ferruginous Duck. *Fuligula nyroca* (Güldenstädt).

The white-eyed or ferruginous duck has occurred over twenty times in Norfolk. The hybrid between this species and the pochard, known as Paget's pochard, has also been met with here on four occasions, last in January, 1897. This specimen is still living on Mr. Gurney's pond at Keswick (July, 1900).

187. Tufted Duck. *Fuligula cristata* (Leach).

The tufted duck is a common winter visitor, and breeds freely in parts of south-west Norfolk.

188. Scaup-Duck. *Fuligula marila* (Linn.).

This duck is a common winter visitor to the coast, sometimes in large numbers; it is occasionally met with on the inland waters.

189. Goldeneye. *Clangula glaucion* (Linn.).

The goldeneye is a common winter visitant, but has been met with here in pairs well into May and once in July.

190. Buffel-headed Duck. *Clangula albeola* (Linn.).

The buffel-headed duck was first made known as British from a specimen now in the Norwich Museum, which was killed at Yarmouth in 1830.

191. Long-tailed Duck. *Harelda glacialis* (Linn.).

Young long-tailed ducks are common, but adults much more seldom met with. A long-tailed duck in full breeding plumage has been killed on Hickling Broad, and another at Acle on June 14th, 1885.

- [Harlequin-Duck. *Cosmonetta bistrionica* (Linn.).

There is a harlequin-duck in the Norwich Museum which was presented in 1839, and entered as killed at Yarmouth; the locality however wants confirmation.]

192. Common Eider. *Somateria mollissima* (Linn.).

This species is occasionally met with on our coast, but adult males are rarely seen.

193. King-Eider. *Somateria spectabilis* (Linn.).

Three undoubted examples of the king-eider have been procured, all at Hunstanton; the first, which I found stuffed and cased in a game dealer's shop in that town, was killed in January, 1888, it is a young male and is now in the Norwich Museum.

194. Steller's Eider. *Somateria stelleri* (Pallas).

This is another of the numerous additions

to the avifauna of Britain which the neighbourhood of Yarmouth has yielded. The only example of Steller's duck for a long time known was a nearly adult male killed at Caistor, in February, 1830, now in the Norwich Museum. The second and only other British example known was killed on the Yorkshire coast in 1845.

195. Common Scoter. *Edemia nigra* (Linn.).

The 'black duck' is sometimes seen in immense numbers off the Norfolk coast and may be observed in small numbers at all seasons of the year. Some frequented Hickling Broad in the summer of 1875.

196. Velvet-Scoter. *Edemia fusca* (Linn.).

The velvet-scoter is a regular visitant in winter off our coast, but by no means numerous.

197. Goosander. *Mergus merganser*, Linn.

Not infrequent in the winter months and seems to affect the inland rivers and lakes. At the time of writing (February, 1900) I am informed there are goosanders on the lake at Holkham. They also frequent the lake at Gunton, and have been killed on the river at Hellesdon and Drayton above Norwich.

198. Red-breasted Merganser. *Mergus serrator*, Linn.

The red-breasted merganser has of late years been singularly rare with us. It has been observed that when the goosander is met with this species is generally absent.

199. Smew. *Mergus albellus*, Linn.

The smew is not very rare as a winter visitant, generally in immature plumage; adult males however are rare in ordinary seasons. Like the goosander they seem partial to fresh-water lakes and streams, and were regular visitors to Holkham lake, which after a temporary desertion they have returned to and are again present this season, February, 1900.

- [Hooded Merganser. *Mergus cucullatus* (Linn.).

The hooded merganser is said to have been obtained at Yarmouth in 1829, and again some time prior to 1838, but the evidence in each case seems to be incomplete.]

200. Ring-Dove or Wood-Pigeon. *Columba palumbus*, Linn.

This bird is common and generally distributed, the home birds go south in severe weather and are replaced by immigrants from farther north and over-sea.

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201. Stock-Dove. *Columba ænas*, Linn.

The stock-dove, although not so frequent as the above and more local, is not uncommon with us. Hard weather brings migratory additions.

Whether the rock-dove visits us is uncertain.

202. Turtle-Dove. *Turtur communis*, Selby.

Now common as a summer migrant, which does not always seem to have been the case.

203. Sand - Grouse. *Syrhaptes paradoxus* (Pallas).

A single specimen of the sand-grouse was shot early in July, 1859, at Walpole St. Peter's, near Lynn, and the remarkable irruptions of this bird into the county in 1863 and 1888, have been fully dealt with in the *Birds of Norfolk*, vol. i. p. 376, vol. iii. p. 392, and in the *Zoologist* for 1888, p. 442. A flock of fifteen is also said to have been seen at Winterton, on May 21st, 1867, by Mr. Boulton, who from previous experience was well acquainted with the bird.

204. Black Grouse. *Tetrao tetrix*, Linn.

The black grouse, although formerly indigenous to Norfolk, is probably confined to a few pairs on the Sandringham estate. Many efforts have been made to re-introduce it in various apparently suitable localities in the county, but with no lasting success.

205. Pheasant. *Phasianus colchicus*, Linn.

206. Common Partridge. <i>Perdix cinerea</i> , Latham.	} All these abound.
207. Red-legged Partridge. <i>Caccabis rufa</i> (Linn.).	

208. Quail. *Coturnix communis*, Bonnatere.

The quail is a spring and autumn visitant and a few remain to breed with us, but it is by no means frequent.

Many Virginian colins have been turned out in Norfolk; the first probably by Mr. Coke (first Earl of Leicester) at Holkham, previous to 1834, but they have not become established. The same may be said of the red grouse.

209. Corn-Crake or Land-Rail. *Grex pratensis*, Bechstein.

This is a summer visitor, very uncertain as to numbers, and by no means abundant.

The green-backed porphyrio has been killed ten times in Norfolk, and six of these near Barton Broad; if all were escapes, the instinct which led them to this particular locality was remarkable. A porphyrio killed near Brandon

in the spring of 1896, proved to be *P. calvus*, undoubtedly an escape.

210. Spotted Crake. *Porzana maruetta* (Leach).

This is with us a spring and autumn migrant, probably a few pairs breed annually in the broads but the nest is very seldom found.

211. Little Crake. *Porzana parva* (Scopoli).

This bird is also a rare summer visitor to the broads, and may not always have been distinguished from the above; it was first observed in 1872, and about eleven examples have been recorded.

212. Baillon's Crake. *Porzana bailloni* (Vieillot).

Baillon's crake is a rare summer visitor and doubtless occasionally breeds in the broads. Two nests believed to have been of this species were found at Potter Heigham in June and July, 1866, probably both belonging to the same bird. Mr. T. E. Gunn had an egg of this bird brought to him, taken in Sutton Broad on May 2nd, 1889.

213. Water-Rail. *Rallus aquaticus*, Linn.

The water-rail is fairly abundant as a resident in the broad district, though somewhat local, and receives considerable migratory additions in spring and autumn. The eggs were ruthlessly taken, and Mr. Bidwell was informed by a dealer a few years ago that he received over two hundred in one season from Yarmouth.

214. Moor-Hen. *Gallinula chloropus* (Linn.).

The moor-hen or water-hen is very abundant and generally distributed.

215. Coot. *Fulica atra*, Linn.

This species is not so numerous as formerly, but is still abundant, particularly on the broads.

216. Crane. *Grus communis*, Bechstein.

The crane is now a rare and uncertain visitor to Norfolk, about eight occurrences are recorded. On April 7th, 1898, a small flock of four rested on the bank of the river Glaven near Wiverton, whence they took their departure, and were seen again at Weybourne and Runton, finally escaping unmolested. Mr. Stevenson's article in the *Birds of Norfolk* (ii. 125) on this bird as a former resident in the fens of Norfolk should be read.¹

217. Great Bustard. *Otis tarda*, Linn.

It is impossible in the few lines here devoted to the subject to do justice to the bustard

¹ See also footnote p. 226 ante.

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as a Norfolk bird. It must suffice to refer to the articles in the *Birds of Norfolk* (ii. 1, iii. 396), where the history of this grand bird is fully treated. Suffice it to say that the last of the indigenous race was killed in the year 1838. Since the latter date, those few which have been met with in Norfolk were passing migrants.

218. Little Bustard. *Otis tetrax*, Linn.

All the little bustards, some seventeen in number, as indeed all that had been met with in England, were winter visitants, and in the corresponding plumage; but early in May, 1898, a beautiful male in full breeding plumage was killed at Kessingland, in the adjoining county of Suffolk.

219. Stone-Curlew or Norfolk Plover. *Ædionemus scolopax* (S. G. Gmelin).

This fine species, after having considerably decreased in numbers, is I hope recovering its lost ground and again returning to some of the summer haunts from which it has been missed.

220. Collared Pratincole. *Glareola pratincola*, Linn.

Five examples of this rare spring migrant have been met with in Norfolk, all, so far as is known, in May or June.

Mr. Stevenson includes the cream-coloured courser as having twice been seen in Norfolk, but as the bird has not been produced, we think it safer to omit it, notwithstanding that both of his informants were excellent field naturalists.

221. Dotterel. *Eudromias morinellus* (Linn.).

Passing 'trips' of the dotterel visit us in May, and again on their return journey in September, but in greatly reduced numbers, and mostly confined to the coast.

222. Caspian or Asiatic Plover. *Ægialitis asiatica* (Pallas).

A beautiful male of this addition to the British fauna was shot near Great Yarmouth on May 22nd, 1890, and is now in the Norwich Museum.

223. Ringed Plover or Ring - Dotterel. *Ægialitis hiaticula* (Linn.).

This plover is a common resident, receiving additions to its numbers in autumn. It nests in several suitable localities on the coast, also, but in reduced numbers, on some of the open 'brecks' in the south-west of the county, where it arrives in February and departs in August. Individuals of the small race with the darker mantle have occurred.

224. Kentish Plover. *Ægialitis cantiana* (Latham).

The Kentish plover is a summer visitor, but rather rare.

225. Golden Plover. *Charadrius pluvialis*, Linn.

A few golden plovers arrive in Norfolk very early in the autumn, and they have been met with in the end of June, but it is not till the end of September that they arrive in any numbers. On the return migration, they have been met with as late as the month of May, in full breeding plumage, but have never been known to nest here.

An example of the Asiatic golden plover (*C. fulvus*) was seen by Mr. Bidwell in Leadenhall Market, which he was assured had been killed in Norfolk (cf. *Ibis*, 1875, p. 513).

226. Grey Plover. *Squatarola helvetica* (Linn.).

The grey plover is a spring and autumn migrant in varying numbers. It is often seen as late as the month of May in perfect breeding plumage.

227. Lapwing. *Vanellus vulgaris*, Bechstein.

The lapwing is still a resident, breeding in sadly decreased numbers. Large flocks visit us in winter and early spring.

228. Turnstone. *Streptilas interpres* (Linn.).

The turnstone visits us in spring and autumn, often making a very late stay in the former season.

229. Oyster-Catcher. *Hæmatopus ostralegus*, Linn.

This is quite a common bird on the north-west coast of Norfolk, much less so on the east coast. A few nest with us in one or two favoured localities.

230. Avocet. *Recurvirostra avocetta*, Linn.

The late Mr. Rising of Horsey, in some MS. notes which I was allowed to copy, and which he confirmed *viva voce*, says: 'In 1814 there were many avocets bred at Horsey. I have found more than six nests in a day. They left altogether after 1824.' This is supported by Lubbock, and I have other confirmatory evidence. There was also a large colony at Salhouse, and in 1853 a marshman assured me that 'years ago' he took many of their eggs every season. The late Mr. Gurney told me that this colony was exterminated in consequence of the demand for avocet's feathers for dressing artificial flies, he thought about the year 1820. At present the avocet is an occasional spring visitor to its old haunts.

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Six appeared on Breydon on May 4th, 1887, four of which were killed; three were on Breydon on June 15th, 1891; one was shot at Stiffkey on October 12th of the same year; two were seen at Hickling on April 23rd, 1893; and two at Salthouse on June 4th, 1898. This bird was known as the 'shoeing horn' at Salthouse.

231. Black-winged Stilt. *Himantopus candidus*, Bonnaterre.

The black-winged stilt is an accidental visitant here on migration. About thirteen examples have been recorded. All but the last were killed in summer; the autumn bird was shot at Castleacre on October 12th, 1895, a few days previous to which two were seen on the Wolferton Marshes by Mr. Plowright and Mr. Petch.

232. Grey Phalarope. *Phalaropus fulicarius* (Linn.).

The grey phalarope is an occasional winter visitant, but never abundant.

233. Red-necked Phalarope. *Phalaropus hyperboreus* (Linn.).

This species is not of infrequent occurrence, generally in autumn and in immature plumage.

234. Woodcock. *Scolopax rusticula*, Linn.

The woodcock is a common autumn visitor in varying numbers, some few remaining to breed in the county every year.

235. Great Snipe. *Gallinago major* (Gmelin).

This species is frequently met with in Norfolk in autumn, but rarely occurs in spring.

236. Snipe. *Gallinago caelestis* (Frenzel).

The snipe is a common resident, but not now found in the immense numbers early writers speak of. Many migratory birds arrive in autumn.

The variety known as 'Sabine's snipe' has twice been met with in Norfolk.

237. Jack Snipe. *Gallinago gallinula* (Linn.).

This is an autumn and winter visitant. It has been met with as late as the month of July, but there is no reason to believe that it has bred here.

238. Broad-billed Sandpiper. *Limicola platyrhynchos* (Temminck).

This species was first recognized as British from a specimen killed on Breydon in 1836, since which time it has been killed three times in that locality and once at Cley, where two were seen, one of which was killed in

August, 1895; of these five occurrences three were in spring and one in autumn.

239. Pectoral Sandpiper. *Tringa maculata*, Vieillot.

Breydon produced the first British-killed pectoral sandpiper in October, 1830; since that time eight or nine others have been obtained in various parts of the coast all in the autumn, with one exception. This was captured in the bird-nets in the Wash on January 9th, 1868.

240. Siberian Pectoral Sandpiper. *Tringa acuminata* (Horsfield).

The Siberian pectoral sandpiper is yet another of the rare migrants which the attractive region of Breydon has added to the British list. On August 29th, 1892, an example of this interesting bird, which I saw in the flesh, was killed by Mr. T. Ground, in whose collection it now is, on the Breydon mud-flats. This example is figured in the *Ibis* for 1898, p. 182. On re-examining the pectoral sandpipers in the Norwich Museum I found a second specimen of this bird, which had been killed near Yarmouth, in September, 1848.

241. Dunlin. *Tringa alpina*, Linn.

This is the most abundant of all our migratory waders. Although it has been met with in every month of the year, it has not been known to breed here.

242. Little Stint. *Tringa minuta*, Leisler.

A spring and autumn migrant, sometimes quite abundant, especially in September. Although as a rule only immature birds occur, it has been met with in full breeding plumage.

243. Temminck's Stint. *Tringa temminckii*, Leisler.

Temminck's stint is rare with us, generally in immature, but occasionally in adult, plumage.

244. Curlew-Sandpiper. *Tringa subarquata* (Güldenstädt).

By no means uncommon with us, especially in the month of September. It leaves us very late in spring, at which time some very perfect specimens in full breeding plumage have been obtained. On July 28th, 1880, Mr. Gurney saw six in most beautiful breeding dress.

245. Purple Sandpiper. *Tringa striata*, Linn.

The purple sandpiper is somewhat rare in Norfolk, but most often met with in early autumn.

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246. Knot. *Tringa canutus*, Linn.

The knot is a common autumn and spring migrant; at the former season mostly young birds occur, but at the latter very fine red birds are often met with.

247. Sanderling. *Calidris arenaria* (Linn.).

The sanderling is most abundant here in autumn, a few are met with in winter, and in the spring they pass till the end of May or even the beginning of June, when they are in perfect breeding plumage.

248. Ruff. *Machetes pugnax* (Linn.).

This is a bird possessed of peculiar interest to Norfolk ornithologists from the persistent way in which it has striven to hold its own as a breeding species in this its last resort in the British Isles. Once very numerous in various parts of the county it is now reduced to one favoured spot, where it is possible an occasional nest may still be met with; but the bird, although it has long lingered on the verge of extinction, must now be regarded in the same light as most of the other sandpipers, that is of a spring and autumn migrant, only one instance being known of its having occurred here in winter.

249. Buff-breasted Sandpiper. *Tryngites rufescens* (Vieillot).

This is a very rare accidental visitor, which has been obtained five times in Norfolk, the last at Blakeney on September 7th, 1899.

250. Common Sandpiper. *Totanus hypoleucus* (Linn.).

The common sandpiper is a spring- and autumn migrant not often met with in summer. It has long been suspected of occasionally breeding in Norfolk, but such was not proved to be the case till May 25th, 1897, when a nest with four eggs was found under a gooseberry bush at Hickling by Mr. Oswin Lee. This curious situation for a nest is not unique. See Thompson's *Natural History of Ireland* (vol. ii. 'Birds,' p. 212).

251. Wood-Sandpiper. *Totanus glareola* (Gmelin).

The wood-sandpiper is also met with during its spring and autumn migration. A very juvenile example, presumptive of its having been bred in the neighbourhood, was taken at Beechamwell about the year 1840 (*Zoologist*, 1846, p. 1324 with fig.).

252. Green Sandpiper. *Totanus ochropus* (Linn.).

This species is met with at all seasons of the year with us, but is most frequent in

autumn. Although suspected of breeding in this county its nest has never yet been discovered.

253. Redshank. *Totanus calidris* (Linn.).

The redshank is still fairly common, and breeds both inland and on the coast.

254. Spotted Redshank. *Totanus fuscus* (Linn.).

This bird is not uncommon in immature plumage. Fine adult examples have been obtained in spring.

255. Greenshank. *Totanus canescens* (Gmelin).

Like so many of its family the greenshank is a passing spring and autumn migrant most of those met with in the former season being young birds. It has not been met with in winter.

256. Red-breasted Snipe. *Macrorhamphus griseus* (Gmelin).

The red-breasted snipe has occurred three times in Norfolk, each time in October and not far from Yarmouth.

257. Bar-tailed Godwit. *Limosa lapponica* (Linn.).

This bird is met with more frequently on the mud-flats of East Norfolk than elsewhere. Although sometimes abundant at the times of migration, it is very uncertain.

258. Black-tailed Godwit. *Limosa belgica* (Gmelin).

The black-tailed godwit probably ceased to breed in Norfolk about the year 1830. It now only occurs at the seasons of migration. It was locally known as the 'shrieker.'

259. Curlew. *Numenius arquata* (Linn.).

The curlew is to be found feeding on the mud-flats at almost all seasons, but most frequently in autumn. A pair nested in Wolferton Fen in the summers of 1889 and 1890.

260. Whimbrel. *Numenius phaeopus* (Linn.).

A common bird on the marshy parts of the coast in spring and autumn.

261. Black Tern. *Hydrochelidon nigra* (Linn.).

Locally, Scare-Crow.

When the black tern ceased to breed in Norfolk is not known, but it must have been very numerous both on the east and west side of the county in suitable localities. In a MS. note dated 1818, Mr. Lubbock says it 'breeds in myriads near Upton Broad and the fens for miles round were enlivened by the blue dars.' After an extensive flood in Hockwold and Fetwell fens, in 1853, three pairs nested

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in that long-neglected neighbourhood; the last nest in Norfolk was taken near Sutton Broad in 1858. This species is now only known to us as a somewhat rare passing migrant.

262. White-winged Black Tern. *Hydrochelidon leucoptera* (Schinz).

The first English specimen of the white-winged black tern was killed at Horsey in May, 1853; since that time several have occurred on that side of the county, chiefly in May and June, and one in August.

263. Whiskered Tern. *Hydrochelidon hybrida* (Pallas).

The rare whiskered tern has only twice been obtained here, the first at Hickling Broad in June, 1847, the second near Dersingham in October, 1890.

264. Gull-billed Tern. *Sterna anglica*, Mont.

Nine of these birds have been killed near Yarmouth at different times between the end of May and September.

265. Caspian Tern. *Sterna caspia*, Pallas.

The Caspian tern has been met with here nine times, all near Yarmouth between the months of May and October.

266. Sandwich Tern. *Sterna cantiaea*, Gmelin.

The Sandwich tern has always been regarded here as a rare spring or summer visitor; but in October, 1891, five were killed, and in September, 1893, seventeen, all at Cley, where two pairs are believed to have bred in that year.

267. Roseate Tern. *Sterna dougalli*, Montagu.

This bird has been killed on two occasions on our coast and seen several times; there is every reason to believe that one or two pairs have nested here more than once.

268. Common Tern. *Sterna fluviatilis*, Naumann.

The common tern had reached a very low ebb as a breeder in Norfolk, where it was once a very numerous species, but judicious protection has worked wonders in at least one favoured locality. All the terns are called 'dars' or 'pearls.' This is the 'big pearl' of the natives.

269. Arctic Tern. *Sterna macrura*, Naumann.

The Arctic tern visits us in the summer and young birds later on, but it has never been proved to breed here.

270. Little Tern. *Sterna minuta*, Linn.

The elegant little tern, once so numerous, is now sadly reduced in numbers, but a few nests are still to be seen. It is known as the 'chit-pearl.' I have also heard it called by the name of 'dip-ears.'

271. Sabine's Gull. *Xema sabinii* (J. Sabine).

Two specimens of this rare gull were killed on Breydon in October, 1881, since that time four others have been obtained on the coast, all in the month of October, and in immature plumage.

272. Little Gull. *Larus minutus*, Pallas.

This is a fairly constant visitor to our coast, generally in the late autumn. Sometimes considerable numbers are met with, as in February, 1870, when after a severe gale from the east over sixty, mostly in adult plumage, were killed on the Norfolk coast. On April 2nd, 1888, a little gull in lovely breeding plumage was killed on Hickling Broad, a second was seen but not obtained.

273. Black-headed or Brown-headed Gull. *Larus ridibundus*, Linn.

This is our most common species at all seasons, and there are two large breeding-places, Scoulton and Hoveton, in Norfolk, other breeding places formerly existed.

274. Mediterranean Black-headed Gull. *Larus melanocephalus*, Natterer.

An adult male was killed on December 26th, 1886, on Breydon. The first fully authenticated British specimen.

275. Common Gull. *Larus canus*, Linn.

The common gull is really common at all seasons, especially in autumn.

276. Herring-Gull. *Larus argentatus*, Gmelin.

This is a common species here, especially in immature plumage.

277. Yellow-legged Herring-Gull. *Larus cachinnans*, Pallas.

A single specimen of this species, a male by dissection, was killed on Breydon on November 4th, 1886. It remained unrecorded till 1897 (cf. *Zoologist*, 1897, p. 572). Mr. Howard Saunders was good enough to confirm the determination of the bird.

278. Lesser Black-backed Gull. *Larus fuscus*, Linn.

The lesser black-backed gull is common at all seasons, especially in immature plumage.

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279. Great Black-backed Gull. *Larus marinus*, Linn.

This fine gull is common along the coast. Many adult birds frequent the sand-banks and the shores of the Wash in summer.

280. Glaucous Gull. *Larus glaucus*, Fabricius.

This gull is not uncommon in winter, though rare in the adult plumage.

281. Iceland Gull. *Larus leucopterus*, Faber.

The Iceland gull is extremely rare on our coast. One in the Dennis collection in Bury Museum was most probably killed near Yarmouth, about the year 1848; another was shot at Caister in November, 1874; and two others in 1892, on the 6th and 28th December, at Yarmouth and Scratby respectively; and another on Breydon on January 15th, 1899.

282. Kittiwake. *Rissa tridactyla* (Linn.).

The kittiwake occurs on our coast at all seasons of the year, mostly in spring and autumn, but is not so numerous as might be expected for so abundant a species. The adults are more frequent than young birds, which is the reverse of what is the case with the other gulls.

283. Great Skua. *Megalestris catarrhactes* (Linn.).

The great skua is an occasional autumn visitor, but rarely met with near the shore. They are sometimes brought in by the herring-boats.

284. Pomatorhine Skua. *Stercorarius pomatorhinus* (Temminck).

The Pomatorhine skua is a regular autumn visitor on our coast. In October, 1879, when there was a great influx of skuas, over one hundred were shot.

285. Arctic or Richardson's Skua. *Stercorarius crepidatus* (Gmelin).

Not uncommon on our coast in autumn.

286. Long-tailed or Buffon's Skua. *Stercorarius parasiticus* (Linn.).

This skua, although an occasional autumn visitor, is not so often met with as the two preceding. In the great visitation of 1879 some very fine examples of this species and the Pomatorhine skua were obtained.

287. Razorbill. *Alca torda*, Linn.

The razorbill is fairly common off the coast during the greater part of the year.

288. Guillemot. *Uria triole* (Linn.).

This is a common species off our coast.

The ringed guillemot has been killed four or five times in Norfolk.

289. Black Guillemot. *Uria grylle* (Linn.).

A few specimens of the black guillemot have occurred in winter and in immature plumage, but an adult was washed ashore at Caister in March, 1875.

290. Little Auk. *Mergulus alle* (Linn.).

The little auk is not rare in winter, occasionally it visits us in considerable numbers, and has often been found far inland under stress of weather. It has occurred three or four times in full breeding plumage in the months of May and July. One was found inland at Downham Market in July, 1846, no description of the plumage is given, but there can be no doubt at that season it must have had the black throat.

291. Puffin. *Fratercula arctica* (Linn.).

Puffins are not so often met with off our coast as might be expected. Occasionally they share the fate of the other members of this family, and are washed ashore in a dead or dying state.

292. Great Northern Diver. *Colymbus glacialis*, Linn.

The great northern diver is not uncommon at sea in winter, but has not been met with here in breeding plumage.

293. White-billed Northern Diver. *Colymbus adamsi*, G. R. Gray.

A specimen has been killed on Hickling Broad by Mr. E. T. Booth in December, 1872 (cf. *Zoologist*, 1896, p. 14). One was also killed at Pakefield, Suffolk, in the spring of 1852.

294. Black-throated Diver. *Colymbus arcticus*, Linn.

The black-throated diver is not uncommon in winter, but more seldom met with than the great northern diver.

295. Red-throated Diver. *Colymbus septentrionalis*, Linn.

Locally, Sprat-Loon.

The red-throated diver is found at sea at all seasons of the year, and is much more frequent than either the black-throated or great northern divers, but it is rare in full breeding plumage.

296. Great Crested Grebe. *Podiceps cristatus* (Linn.).

The great crested grebe is one of the glories of the Norfolk broads, where it arrives in

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March, and remains to breed. Once reduced to a very low ebb, but judicious protection has resulted in restoring this bird to almost its former numbers.

297. Red-necked Grebe. *Podiceps griseigena* (Boddaert).

This grebe has never been proved to breed in Norfolk, although it has more than once been met with in full breeding plumage. It visits us in late autumn and early spring.

298. Slavonian Grebe. *Podiceps auritus* (Linn.).

The Slavonian grebe is not uncommon as a winter visitor, the greater number occurring in the month of February, but a few have been met with as late as April and May, in full breeding plumage.

299. Eared or Black-necked Grebe. *Podiceps nigricollis* (Brehm).

This is essentially a summer visitor, and has occurred in numerous instances in full breeding plumage, generally in the months of April and May; one was seen in July, others in August and September, and twice in winter, but has not been known to breed here.

300. Little Grebe or Dabchick. *Podiceps fluviatilis* (Tunstall).

The little grebe, or dabchick, is our only resident grebe. It is fairly common in suitable localities, and receives considerable additions to its numbers in the autumn.

301. Storm-Petrel. *Procellaria pelagica*, Linn.

The storm-petrel is not infrequent on our shores, especially after severe weather at sea, when it has been found far inland.

302. Leach's or Fork-tailed Petrel. *Oceanodroma leucorhoa* (Vieillot).

This petrel has occurred a good many times on our coast, but at uncertain intervals, and in the winter months. One, however, was killed at Yarmouth in July, 1867.

[Wilson's Petrel. *Oceanites oceanicus* (Kuhl).

Mr. Gurney has a Wilson's petrel, said to have been killed in Norfolk, and another is

mentioned by Yarrell (edit. 4, vol. iv. p. 49), but Mr. Gurney considers the authenticity of both these doubtful.]

303. Great Shearwater. *Puffinus gravis* (O'Reilly).

In December, 1892, a fine adult great shearwater was picked up dead on Caister beach. In August, 1896, it is believed that one was seen off Blakeney, and in November, 1898, one of these birds was brought into Lowestoft.

304. Sooty Shearwater. *Puffinus griseus* (Gmelin).

This species has occurred once in Norfolk. The specimen was obtained on June 25th, 1851, near Lynn, and is in the museum of that town. At the time it was recorded as *P. cinereus*.

305. Manx Shearwater. *Puffinus anglorum* (Temminck).

The Manx shearwater is occasionally met with in autumn, and after severe weather has been found far inland.

306. Little Dusky Shearwater. *Puffinus assimilis*, Gould.

This bird was originally recorded as *P. obscurus* (Zoologist, 1858, p. 6096; *P.Z.S.*, 1882, p. 421); but a subsequent examination by Mr. Howard Saunders resulted in its being referred to this species. It was found dead at Earsham in April, 1858.

307. Capped Petrel. *Æstrelata hæsitata* (Kuhl).

The only known British specimen of this rare wanderer, now in Mr. Newcome's collection, was caught alive at Southacre, near Swaffham, Norfolk, in the spring of 1850.

308. Fulmar. *Fulmarus glacialis* (Linn.).

The fulmar, although probably abundant out at sea in autumn and winter, seldom approaches the shore except when storm driven, under which circumstances they have occasionally been met with in numbers.

MAMMALS

In a highly-cultivated district such as the county of Norfolk there is, as might be expected, a marked absence of the larger mammals other than those preserved as objects of sport in some form ; nevertheless there remain considerable tracts of wild ground which from the nature of the soil or other causes are likely to continue to afford shelter to some species not directly protected. The most noteworthy of these is perhaps the otter, which holds its own in the trackless reed-beds and sedge-covered marshes of the broads, and in the rough herbage which clothes the margins of the sluggish rivers. The quiet maintained in the numerous strictly-preserved game coverts is favourable to the habits of others, especially to the smaller carnivora and rodents, in spite of the efforts of an army of gamekeepers for their destruction. The wild cat has here long since disappeared, but the marten and badger are still met with, the former at long and uncertain intervals, the latter more frequently, but the native race of each has been exterminated, and both should be regarded either as accidental wanderers or escapes, and the once abundant polecat has become very rare. The indigenous race of foxes has doubtless long been extinct, and it is likely that those now at large in this county are the offspring of strangers introduced to keep up the supply of these animals in a hunting country. The old English black rat (*Mus rattus*) has till quite recently been regarded as all but, if not quite, extinct as a native, and the discovery of a considerable colony of this species in the town of Great Yarmouth by Mr. Patterson, although very interesting, must, I think, be taken to indicate rather a re-introduction than a survival of the race. In the list which follows the marine mammals are largely represented. This might be expected from the varied and extensive sea-board which forms so large a section of the boundary of the county, more especially of that portion facing west and bordering the great estuary of the Wash lying between the counties of Lincolnshire and Norfolk and extending to the outfall of the river Ouse at King's Lynn. Here exist many miles of littoral swarming with crustacea of various kinds and vast quantities of marine molluscs, admirably adapted to the requirements of some species of the Phocidæ, whilst the great extent of tidal waters, for the most part shallow, consisting of a network of sand-banks intersected by deep channels, form a veritable trap for the entanglement of stray Cetaceans wandering from the deep waters. It is possible that a closer examination of the individuals of both these families, which from time to time are met with but seldom come under the observation of a competent authority, might still add to the number of recognized species

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in each case (this has certainly been the experience of the writer), and might also reveal some unlooked-for facts as to their frequency or otherwise and the periods of their occurrence, for experience indicates that some species are as constant in their migratory movements as the recognized birds of passage, and pass along our coast with the same unerring regularity. It is not unlikely that the bottle-nose dolphin (*D. tursio*) visits the Norfolk waters at certain seasons, but I know of no instance of its capture, nor have I hitherto been able to record the occurrence of the common dolphin (*D. delphis*), which latter seemed to be well known to Sir Thomas Browne.

Another family in which there is scope for further investigation is that of the Cheiroptera. It is probable that a closer study of these animals would be rewarded by the addition of two or three species at present not recognized as occurring in Norfolk; the serotine, hairy-armed bat, Daubenton's and the whiskered bat should be looked for.

I make no apology for these brief remarks, for it is often as interesting and instructive to a faunist to know what species, which might reasonably be expected to occur, are missing from a certain district as it is to know those which are actually met with.

The chief authorities on the Mammals of Norfolk are Messrs. C. J. and James Paget, who published a list in their *Sketch of the Natural History of Great Yarmouth*, in 1834; the Rev. Richard Lubbock in his *Observations on the Fauna of Norfolk*, 1845 (2nd edit., 1879) and many scattered records in the pages of the *Zoologist*. The present writer has also contributed a list to the Norfolk and Norwich Naturalists' Society, which, with Supplements, will be found in their *Transactions*, vol. i. (1870-71) p. 71; vol. iii. p. 657; vol. v. p. 632; and vol. vi. p. 493. Other references will be found in the notes which follow.

Of the forty-five species recorded we have the monopoly of at least four.

CHEIROPTERA

1. Long-eared Bat. *Plecotus auritus*, Linn.

Common. A cream-coloured variety has been met with.

2. Barbastelle. *Barbastella barbastellus*, Schreber.

Bell—*Barbastellus daubentonii*.

Not a rare bat in Norfolk, and generally distributed throughout the county.

3. Parti-coloured Bat. *Vespertilio murinus*, Linn.

Natterer—*Vesperugo discolor*.

A doubtful British species. The late Mr. John Hancock had a parti-coloured bat which was taken in the rigging of a vessel in Yarmouth Roads in the year 1834 (Vide *Trans.*

Norf. and Nor. Nat. Soc., vol. i. [1873-74] p. 80).

4. Great or White's Bat (Noctule). *Pipistrellus noctula*, Schreber.

Bell—*Scotophilus noctula*.

Common.

5. Pipistrelle. *Pipistrellus pipistrellus*, Schreber.

Bell—*Scotophilus pipistrellus*.

Common.

6. Natterer's Bat. *Myotis nattereri*, Kuhl.

Bell—*Vespertilio nattereri*.

By no means rare in Norfolk, mostly frequents out-buildings. Mr. Norgate found one at Sparham in a nesting-box placed in a hole in a wall for titmice.

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INSECTIVORA

7. Hedgehog. *Erinaceus europæus*, Linn.

Common.

8. Mole. *Talpa europæa*, Linn.

A variety, white or cream-coloured above and rusty-yellow beneath, is quite common in certain low-lying lands in the neighbourhood of Oby, Clippesby, and some other places. Of twenty-five dozen moles taken at the latter place thirty-five were white. I am informed mixed broods are never found. In six pregnant moles examined by me on March 26th and 28th, 1878, four contained four young ones each, the remaining two only three each.

9. Common Shrew. *Sorex araneus*, Linn.

Common.

10. Pigmy Shrew. *Sorex minutus*, Linn.

Bell—*Sorex pygmæus*.

The lesser or pigmy shrew was first identified as a Norfolk species by Mr. Frank Norgate from a specimen taken at Sparham Heath in June, 1874, since which time it has proved to be by no means rare. An albino variety was killed at Thetford.

11. Water Shrew. *Neomys fodiens*, Pallas.

Bell—*Crossopus fodiens*.

The typical form of the water-shrew, with the under parts pure white appears to be rare in Norfolk. The form formerly known as *S. remifer*, the oared shrew, with the dark under parts and chestnut throat, being much more frequent; but I have met with every intermediate variety of colouring.

CARNIVORA

12. Fox. *Vulpes vulpes*, Linn.

Bell—*Vulpes vulgaris*.

But for the protection afforded by sportsmen, it is not probable that the fox would long be tolerated in a game country, and doubtless those now found in Norfolk owe their origin to other parts of the kingdom, or to importation from abroad. I have been told that at a time when foxhounds were given up in Norfolk some of the foxes were trapped and sent into Leicestershire, Bedford, etc., and that many of these, having been previously marked, were again trapped in Norfolk. Some of the Westacre foxes, which, I believe, owe their origin to the continent of America, do not make 'earths,' but ascend fir trees, and lie some thirty feet above the ground, on the top branches, all day.

13. Pine Marten. *Mustela martes*, Linn.

Bell—*Martes abietum*.

The pine marten was probably not uncommon at the commencement of the present century; so late as the year 1811 forty-three were killed on one estate near Bury St. Edmunds in the adjoining county of Suffolk, but it is likely that the last of the native race in Norfolk did not long survive that date. In 1864 a marten was trapped at Kelling and another in July, 1878, at Hevingham, near Norwich. In the latter case every endeavour was made to trace its origin with-

out success, but I have little doubt both were escapes.

14. Polecat. *Putorius putorius*, Linn.

Bell—*Mustela putorius*.

The polecat, formerly common enough, has become very scarce in this county, and seldom comes into the hands of our local bird-stuffers.

15. Stoat (Ermine). *Putorius ermineus*, Linn.

Bell—*Mustela erminea*.

Locally, *Lobster*.¹

This species is common in Norfolk, and is frequently found in full white winter dress; this change does not appear to depend so much on the severity of the weather as is generally believed. In 1882 I counted forty-one white, or nearly white, stoats in a bird-stuffer's workroom at Thetford, all killed in one year, the chief attraction being doubtless the extensive rabbit warrens in that neighbourhood.

16. Weasel. *Putorius nivalis*, Linn.

Bell—*Mustela vulgaris*.

Female, 'mouse hunter.' Common. I have twice seen examples showing a considerable extent of white fur, probably partial albinism, a change which appears to be rare in this species.

¹ It has been suggested that this is a corruption of 'leapster' from its mode of progression.

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17. Badger. *Meles meles*, Linn.

Bell—*Meles taxus*.

Badgers are met with in Norfolk from time to time, but I doubt whether they can now be regarded as truly indigenous to the county. The most recent occurrences are one shot by a keeper in Holkham Park in January, 1893, and a second in November of the same year at Whitlingham near Norwich. A badger, which was suckling two young ones, was trapped at West Wretham in April, 1895, and in July, 1899, an old female and three young ones were killed at Forncett (vide *Field*, 22nd and 29th July, 1899). Even allowing for the nocturnal habits of this animal, I doubt whether as permanent inhabitants they would long escape notice.

18. Otter. *Lutra lutra*, Linn.

Bell—*Lutra vulgaris*.

The otter still holds its own in its great stronghold, the broads, and is occasionally found in all the streams of the county. With us it is decidedly a winter breeder, and the usual number of young is two or three; only once out of many instances could I satisfactorily ascertain the number to have been four. Thirty-seven pounds is the greatest weight I have known a male otter to attain; the female does not reach so great a weight as the male. For an account of the habits of this animal as observed in Norfolk, see the *Trans. Norf. and Nor. Nat. Soc.*, vol. i. [1872-73] p. 79; also *Zoologist*, 1877, p. 172, and 1888, p. 248.

19. Common Seal. *Phoca vitulina*, Linn.

The common seal is found in some numbers frequenting the sandbanks in the great estuary of the Wash, between Norfolk and Lincolnshire, where it breeds, and is frequently captured by the fishermen. It also

occurs on other parts of the coast, and occasionally far up the fresh-water rivers. In two instances it has been captured in the river Ouse, about forty miles in a direct line from the sea.

20. Ringed Seal or Floe-rat. *Phoca hispida*, Schreber.

The claim of this species to be admitted to the British Fauna rests upon a specimen killed on the Norfolk coast in 1846, the skull of which is in the Norwich Museum. The late Mr. J. H. Gurney, who purchased the seal in the flesh and presented the skull to the Museum, called the writer's attention to this skull in 1871, and upon submitting it to the late Sir W. H. Flower he confirmed its identification as belonging to this species (*Proc. Zoo. Soc.*, 1871, p. 506).

21. Grey Seal. *Halichærus grypus*, Fabricius.

The grey seal is also an inhabitant of the Wash, whence both old and young have been obtained. The first occurrence with which I am acquainted was in December, 1881, when an old female and a young one in first coat were killed and brought to Lynn (cf. *Trans. Norf. and Nor. Nat. Soc.*, iii. 415). A young female, now in the Norwich Museum, was killed on Breydon Broad, in November, 1882, and a very old female was captured at Wells in February, 1892. I have heard of others which I suspected to be of this species but had no opportunity of verifying.

22. Bearded Seal. *Phoca barbata*.

A young male of this species was captured alive at Burnham Overy, and after being exhibited about the country for some months died at Lynn in February, 1892. The skull is preserved in the University Museum of Zoology at Cambridge. Full particulars of the event will be found in the *Trans. Norf. and Nor. Nat. Soc.*, v. 555.

RODENTIA

23. Squirrel. *Sciurus leucourus*, Kerr.

Bell—*Sciurus vulgaris*.

Common in suitable localities.

24. Dormouse. *Muscardinus avellanarius*, Linn.

Although this interesting little animal is said to have been found in Norfolk by Paget (1834), and in 1838, by a writer in the *Edinburgh Journal of Nat. Hist.* (vol. i. 1835-39), like Mr. Lubbock in 1845, I was

long unable to verify its occurrence in the present day; a correspondence in the *Field*, however, revealed the fact that it is still met with in the south-east corner of the county, but even there it is not quite certain its presence is not due to the introduction of some six or seven specimens procured from Surrey fifty years ago.

25. Brown Rat. *Mus decumanus*, Pallas.

Common.

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26. Black Rat. *Mus rattus*, Linn.

I have seen a drawing of a typical *M. rattus* made by W. Arderon, F.R.S., from a Norwich killed specimen in 1749. He speaks of the species as 'very mischievous' and evidently regarded it as a rarity. Messrs. Paget speak of it in 1834, as still remaining at Yarmouth, 'though its numbers are gradually decreasing,' and Mr. Lubbock, in 1845, merely observes 'that it is still occasionally found in the City of Norwich.' The only Norfolk killed example I ever met with, until those I shall shortly have to mention, was at Lynn, where I saw a single specimen about the year 1850. From this evidence I was inclined to think the species had long been very rare in this county, and in 1871 I was constrained to speak of it as probably extinct as a native. In 1896, Mr. Patterson discovered this species in considerable numbers in certain localities in Yarmouth, where it seems to have established itself, and from that time to the present, he has had no difficulty in obtaining all he required. I have several times obtained *Mus alexandrinus* in Norwich, and Mr. Patterson has sent me specimens from Yarmouth. Probably both these forms are importations from southern ports in grain ships.

27. House Mouse. *Mus musculus*, Linn.

Common.

28. Wood Mouse or Long-tailed Field Mouse.
Mus sylvaticus, Linn.

Common.

29. Harvest Mouse. *Mus minutus*, Pallas.
Common.

30. Water Vole. *Microtus amphibius*, Linn.
Bell—*Arvicola amphibius*.

Common. The black variety is often met with in Norfolk, and an albino has been killed.

31. Field Vole. *Microtus agrestis*, Linn.
Bell—*Arvicola agrestis*.

Common. Mr. Lubbock speaks of this species as 'the mouse of the marshes, the staff of life, as it were, of the weasel and the kestrel hawk.' (In the *Fauna of Norfolk*, edit. 2, p. 10, I have inadvertently quoted this remark as applied to *M. sylvaticus*.)

32. Bank Vole. *Eutamias glareolus*, Schreber.
Bell—*Arvicola glareolus*.

Not uncommon, probably frequently passed unnoticed.

33. Common Hare. *Lepus europæus*, Pallas.
Bell—*Lepus timidus*.

Varieties with 'fur like chinchilla,' parti-coloured, and perfectly black, have been recorded.

34. Rabbit. *Lepus cuniculus*, Linn.

Common. A black or silver-grey race of rabbits has long been established about Thetford and Brandon.

CETACEA

35. Atlantic Right Whale. *Balæna biscayensis*, Eschricht. (*Balæna glacialis*, Bonaterre).¹

The only reliable record of the occurrence of a true *Balæna* on the Norfolk coast is one mentioned by Messrs. Paget in their *Nat. Hist. of Yarmouth*, under the head of *B. mysticetus*. Granting this to have been a right whale (which there seems to be no reason to doubt), from the season of the year—8th July, 1784—as well as from its small size, it could only have belonged to this species which inhabits the temperate seas of the northern hemisphere; it is known as the Atlantic right whale, and is now of very rare occurrence.

¹ The names in brackets are those advocated by Dr. F. W. True, of the United States National Museum, in his revision of the names of the European Whalebone Whales (*Proc. U.S. Nat. Mus.*, xxi. 617–635).

36. Common Rorqual. *Balænoptera musculus*, Linn. (*Balænoptera physalis*.)

By no means infrequent off our coast, several have also been stranded or washed ashore dead.

37. Lesser Rorqual. *Balænoptera rostrata*, Fab. (*Balænoptera acuto-rostra*, Lacépède.)

Much less frequent than the preceding species. I have only four records of its occurrence on the Norfolk coast.

38. Sperm Whale. *Physeter macrocephalus*, Linn.

The occurrences of several stranded examples of the sperm whale on the Norfolk coast are recorded by Sir Thomas Browne about the year 1626, the skull of one of which is still to be seen in the court yard at

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Hunstanton Hall, others in 1646, and a very ancient skull of one of these Cetaceans is used as a chair in Yarmouth Church, but I know of no modern instance of its having been met with here.

39. Bottle-nose Whale. *Hyperoodon rostratus*, Chemnitz.

The bottle-nose whale has occurred several times on the Norfolk coast, generally the old female accompanied by its young coming southward in the autumn. The adult male has not been met with here.

40. Sowerby's Whale. *Mesoplodon bidens*, M. P. Gervais.

A female, from which a full-grown foetus was taken, was captured in the surf at Overstrand near Cromer, on the 18th December, 1892, vide *Ann. & Mag. Nat. Hist.*, April, 1893.

41. Narwhal. *Monodon monoceros*, Linn.

In *Purchas his Pilgrimes*, and most fully related in the 2nd edit. (Lond. fo. 1614) p. 739, is an interesting account of the finding of one of these animals on the Norfolk coast so long ago as the year 1588. I know of no modern instance.

42. Grampus or Killer. *Orca gladiator*, Lacépède.

In Mackerell's *History of Lynn* 'twelve grampuses' are said to have come ashore there in 1636, another in 1680. Sir Thomas Browne (Wilkin's edit., iii. p. 325) mentions one at Yarmouth, about 1658, and from that time to the present they have been met with in many instances. Two very juvenile examples were brought into Yarmouth on November 13th and 19th respectively, 1894; they were so nearly of an age as to render it probable that they were both the offspring of the same parent.

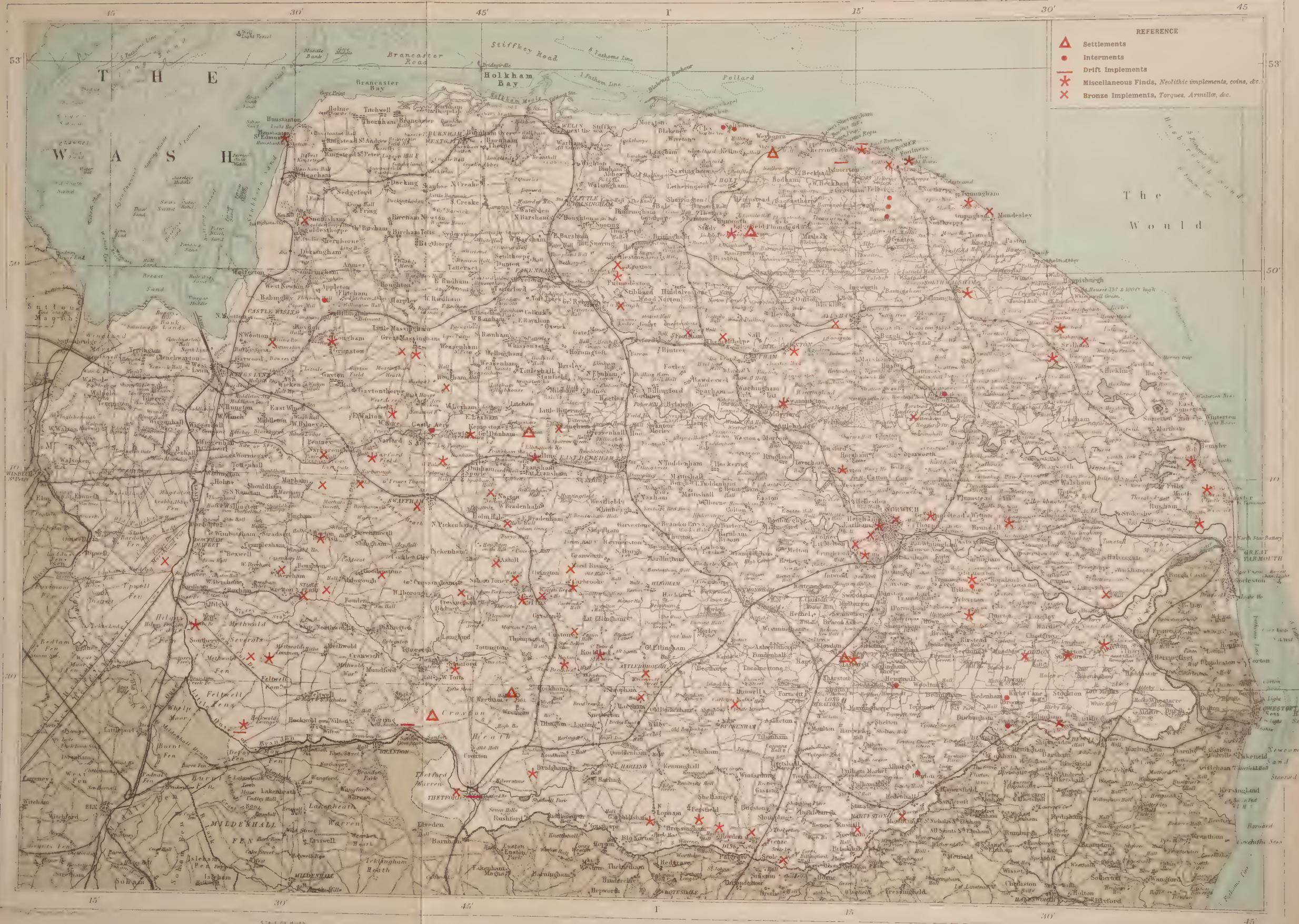
43. Pilot Whale. *Globicephalus melas*, Traill.

A female was stranded at Mundesley on 29th January, 1879.

44. Porpoise. *Phocæna communis*, F. Cuv.
Common.

45. White-beaked Dolphin. *Delphinus albirostris*, J. E. Gray.

The white-beaked dolphin is of frequent occurrence on the Norfolk coast in the spring on its journey northward, and again in the autumn on its return south. I have met with a very young individual in the month of September and a female containing a foetus in June.



EARLY MAN

THAT portion of the story of man which precedes the period of written history must ever be one of the most interesting subjects of human study. The absence of documentary evidence only increases the importance of the remains which belong to the prehistoric period ; and every fragment of human handiwork of that time, the circumstances of its discovery, and its association with or relation to other remains, all deserve the most careful attention from those who seriously desire to obtain something like a complete idea of the subject of our earliest ancestors.

In this attempt to present a sketch of early man in Norfolk it seems desirable therefore to consider in some detail the various antiquities which have been found, to explain what they teach us, and to give such particulars as may be possible or desirable concerning their distribution and relative age.

At the outset it may be remarked that antiquaries are practically unanimous in their views as to the various ages into which the prehistoric period may reasonably be divided. Here, as in many other parts of the world, the first sign of man is found in stone implements rather than in the traces of dwellings or graves, or remains of man himself.

Confining our remarks for the present to what is known as the Stone age, it may be pointed out that this is divided into two well-defined sections, viz. the older or Palæolithic, and the newer or Neolithic age.

NORFOLK IN THE PALÆOLITHIC AGE

The inhabitants of Norfolk during the earlier or Palæolithic age lived at a time when what is now Great Britain and Ireland was united to the continent of Europe, and when as a consequence the climate was subjected to greater variations than those which our present insular position gives us. Man's status in the scale of civilization at this time may be inferred from the following facts. He did not possess the knowledge of making pottery, neither was he capable of working metals. Such of his implements and weapons as were formed of stone were shaped by chipping : the art of shaping a flint or stone by means of grinding seems to have been entirely unknown to him. He had no domesticated animals, and it is probable that he did not cultivate the soil for vegetable crops. The evidence points to the conclusion that his



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means of subsistence consisted of such food as could be procured by hunting, fishing, etc.

This race of men was widespread over the surface of the world. Remains which have been discovered show that it existed all over western and southern Europe, northern Africa, Asia Minor and over the whole extent of India.

So much has been written about the supposed inferiority of man in the Palæolithic age that many people have been led to suppose that he was a very low type of animal. This assumption, however, has been based upon insufficient data, and without due appreciation of the fact that he was in possession of artistic accomplishments of a by no means low order. It is clear from remains of his handiwork which have been discovered that he was able to make vigorous sketches of animals and other objects, and to fashion useful tools out of rough flints. Of his dwellings little is known save that he inhabited caves and rock-shelters, but it is impossible to suppose that he had no means of building houses and adapting many things and circumstances of nature to his requirements. Clothing he doubtless made for himself from the skins of animals, and there is every reason to believe that he was able to make for himself many implements which are unknown to us for the simple but sufficient reason that they were composed of less imperishable materials than flint and stone.

With regard to the physical aspect of man in the Palæolithic age it is interesting to have the valuable opinion of such an eminent authority as Mr. E. T. Newton, F.R.S.¹ In an address delivered in 1898 before the Geologists' Association of London Mr. Newton said, in words too weighty and important to be epitomized :

‘At present we have too few examples of the skulls of Palæolithic men to allow us to speak dogmatically of their typical characters, but what we do know about them shows that their cephalic index is much the same as the Neolithic men, from whom they seem to be chiefly distinguished by the greater development of their brow ridges, their low and receding foreheads and their shorter stature.

‘The advanced intelligence of Palæolithic man is abundantly proved by his tools and works of art, which have been preserved in far greater numbers than his bones. The well-fashioned flint implements, the striking outlines of the mammoth, horses, reindeer and human figures incised on pieces of ivory and bone, as well as the clever carvings of animals in these same materials, are ample evidence that the men who lived with the Mammoth possessed no mean artistic ability and no little mechanical skill.’

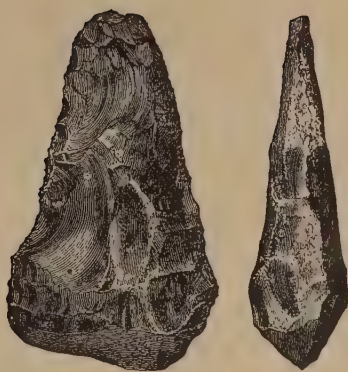
Mr. Newton adds : ‘There will be a tendency to credit Palæolithic man with a somewhat higher social status than we have usually supposed him to have enjoyed.’

Little if anything is known about the graves or methods of sepulture of man in the Palæolithic age, most if not all of the interments

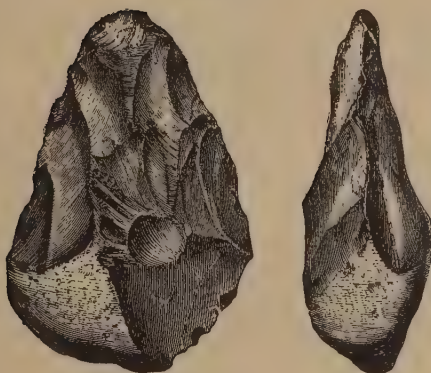
¹ *Proceedings of the Geologists' Association*, xv. pp. 262, 263.



BROMEHILL, BRANDON.



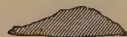
SHRUB HILL, FELTWELL.



SHRUB HILL, FELTWELL.



SHRUB HILL, FELTWELL.



GRAVEL HILL, BRANDON.



SHRUB HILL, FELTWELL.

PALÆOLITHIC IMPLEMENTS.

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which have been supposed to belong to that remote period having been proved upon close examination to belong to the Neolithic or subsequent races. The Palæolithic race is generally supposed to be extinct, although Dr. Boyd Dawkins¹ considers that the Cave men are represented by the Eskimos.

Remains of this early period found in Norfolk form a very interesting and important contribution towards the story of Palæolithic man. They consist of flint implements, much rolled and waterworn, obtained from a gravel-pit at Bromehill² in the parish of Weeting, about a mile and a quarter east of Brandon. This pit is in the valley of the Little Ouse, and the lower gravel, which contains a few implements of black colour, is only slightly above the level of the adjacent river.



PALÆOLITHIC IMPLEMENT, GRAVEL HILL, BRANDON.



PALÆOLITHIC IMPLEMENT, GRAVEL HILL, BRANDON.

Redhill³ near Thetford is another place where Palæolithic implements have been found. As early as the year 1865 implements were found here in the river gravels of the Little Ouse. The discovery was made by a workman, and upon the fact becoming known further search was made in the district, with the result that other implements were obtained at Whitehill, further down the valley and also on the Norfolk side. Subsequent searches have been rewarded by the discovery of numerous specimens in the neighbourhood of Brandon⁴ and at Shrub Hill⁵ in the parish of Feltwell. The

¹ *Early Man in Britain*, p. 233.

² Evans, *Ancient Stone Implements*, ed. 2, p. 560.

³ *Op. cit.* p. 550; *Quarterly Journal of the Geological Society*, xxiii. pp. 45-55.

⁴ *Op. cit.* p. 550.

⁵ *Op. cit.* pp. 550, 568, 569.

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Shrub Hill gravel in which the implements were found caps a low-lying hill in the middle of the fens, and is about eight miles nearly due west of Brandon and one mile north of the present course of the Little Ouse.

In the neighbouring county of Suffolk (and also in the valley of the Little Ouse) is Santon Downham, where several hundreds of Palæolithic implements have been found in the river gravel. Many of these implements have been shaped with unusual skill, and are highly finished examples of Palæolithic art.¹

A discovery of a particularly interesting nature was made in 1878 in the cliff by the sea-shore at West Runton near Cromer. Here at a depth of 12 feet from the surface, in what was evidently the filled-up channel of an ancient river, and above a freshwater bed, a fine well-made implement of flint $4\frac{3}{8}$ inches was found. Sir John Evans subsequently found a large ochreous flake of Palæolithic age on the sea-shore below the cliff.²

Other discoveries deserving of notice were an ochreous implement, found by Mr. F. C. J. Spurrell in 1882 in Aylmerton parish not far from Sheringham Heath,³ and a tongue-shaped implement, procured in 1884⁴ at South Wootton.

Palæolithic remains found in drift gravels are naturally more or less modified by drift wear. They are usually large flakes, hatchets of pointed form, or ovate implements. Smaller and more delicately made tools have however been found in the deposits in caves among remains that are considered by some to be characteristic of Cave man. How far the period of the River Drift man may have been distinct from that of the Cave man is a question upon which there is some difference of opinion. Some authorities⁵ consider the latter to be marked by a distinct advance in civilization, whilst others⁶ regard the remains of the so-called Cave man as indicative of the domestic side of the life of early man, the remains found in the river drift consisting mainly of rough hatchets, etc., being supposed to represent the implements and weapons used in his outdoor occupations, such as warfare and hunting.

Whatever the relationship of Drift man and Cave man may be finally proved to have been, there can be no question that the Palæolithic age as a whole occupies a well-defined period. It represents probably the first appearance of man in this part of the globe, and is sharply divided from the Neolithic age by a long interval of time and some not inconsiderable geological changes during which the surface of our islands was brought to much the same physical condition as that in which we now find it.

Before passing on to consider the later age of stone or Neolithic

¹ Evans, *Ancient Stone Implements*, ed. 2, pp. 559, 560.

² *Op. cit.* p. 572.

³ *Op. cit.* p. 572.

⁴ *Op. cit.* p. 572.

⁵ W. Boyd Dawkins, *Early Man in Britain* (ed. 1880), p. 244 *et seq.*

⁶ Evans, *Ancient Stone Implements*, ed. 2, pp. 474, 475.

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age however, a word or two may be conveniently added with regard to the general characteristics of the stone implements of the two ages Palæolithic and Neolithic, and the chief points in which they differ.

Palæolithic implements differ from Neolithic in several points. Not only is there a much greater variety of form in the latter, but the methods of manufacture present certain well-marked differences. The most important is this. A Palæolithic implement was formed by a few bold and skilful blows, and the stone so shaped was sometimes one that had been procured for the purpose from the chalk, and sometimes one of the worn flints picked up from the coarse gravels of the river drift. A Neolithic implement on the other hand was usually made from flint of the special kind that was found to be most suitable for the purpose, and shaped by many careful blows. Broadly the distinction between the two methods may be said to be this: the Palæolithic man shaped his tools by primary working, whilst the Neolithic man shaped his first by primary working and finished them by secondary chipping, and in some instances, particularly in the case of axes or celts, by grinding the whole or a portion of the surface to a cutting edge.

NORFOLK IN THE NEOLITHIC AGE

The Neolithic age in Norfolk is represented by many important remains. Flint implements, particularly in the form of beautifully shaped arrowheads and ground or partially ground celts, personal ornaments, hut-floors, flint mines, graves and camps are the main classes into which the various remains may be conveniently divided, and they enable us to form a fairly complete idea of the methods of warfare, pursuits, industries and arts of early man in Norfolk in the Neolithic age.

The Neolithic age is in fact specially well represented in the various prehistoric antiquities found in Norfolk. Not only are the actual specimens of weapons and implements of great interest on account of their varieties, but antiquaries have succeeded in identifying the sites of quarries where the raw material was obtained and of the factories where it was worked into shape. From what has been said already it will have been evident that the maker of Neolithic implements attached considerable importance to procuring the best material, and the following facts about Grime's Graves will show that he took infinite pains in order to procure the kind of flint that was best suited to his purpose.

The flint mines at Grime's Graves,¹ situated in a wood about three miles north-east of Brandon, afford some interesting and highly important information upon the methods adopted in Neolithic times for procuring suitable flint for the manufacture of implements. The so-called 'graves,' 254 in number, occupy a space upwards of 20 acres in extent. They are really circular depressions in the surface of the earth

¹ *Journal of Ethnological Society of London* (new series), ii. pp. 419-39; *Proceedings Society of Antiquaries of Scotland*, viii. pp. 419-28; Evans, *Ancient Stone Implements*, etc., ed. 2, pp. 33, 34; *Journal Archaeological Association*, viii. p. 77; *The Illustrated Archaeologist*, June, 1893.

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from 20 feet to 65 feet in diameter, and situated about 25 feet apart. For some time these pits were regarded by antiquaries as the floors of primitive dwellings similar to if not identical with those hut-sites of Neolithic age which have been known as hut-circles or pit-dwellings. It was evident to some however that their size was so much greater than that of the usual Neolithic hut-circles as to suggest a doubt if they were really the sites of ancient dwellings.

Careful examination of one of these pits, and the evidence of the objects discovered within it, as well as on the surface of the ground, have enabled us to understand how the pits were originally made and by whom and for what purpose. The pit selected for examination was found to be an ancient excavation 39 feet deep and 28 feet in diameter, but like the other specimens near it had been filled up with waste material to within about 4 feet from the surface. It had been cut through a bed of dark yellow sand 13 feet thick, which at this point overlies the chalk. The sand contains several irregularly shaped nodules of flint, but the quality of the stone was not sufficiently good for the purposes of implement-making, and the pit had therefore been carried to a greater depth where two bands of flint were reached. The lower of these bands, occurring at a depth of 39 feet from the surface, was found to be of the average thickness of 7 inches and of the finest quality in every respect. It was clear that this was the band of flint sought for with so much labour by men in Neolithic times, and the excavations made for the purpose of reaching it had come in the course of time to be regarded as graves.

The same band of flint occurs much nearer the surface about a mile to the south-west of Grime's Graves, where it is now worked for flint-knapping, but the bed is thinner than that at Grime's Graves and the flint is of inferior quality. The fact that man in the Neolithic age made a large number of shafts about 40 feet deep in order to procure the special kind of raw material that was most suitable for implement-making is a valuable testimony to the skill and energy of that ancient race. It also proves a familiarity with the structure of the earth for which otherwise we should hardly have been prepared.

All the evidence that has been collected concerning Grime's Graves goes to show that the pits have in every case been nearly filled up with removed material. It is pretty clear that this was done in Neolithic times, and was simply a convenient method of disposing of the waste material resulting from fresh excavations. In removing this old material from the pit during the course of Canon Greenwell's examination numerous bones of animals were met with, and these had in most cases been broken open in order that the marrow might be extracted, presumably for human food. Other objects found included charcoal, chippings and cores of flints, pebbles for flaking and bruised by having been so used, and tools of deer's horn. The last consisted chiefly of picks and hammers made from the antlers of the red deer, and those found during the work of exploration bore many marks of severe wear, being splin-

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tered, battered and cut by contact with the hard chalk and sharp flints encountered in the work of mining for flint.

The method of mining at Grime's Graves seems to have been this: the ancient miners sunk a shaft, more or less circular in form and gradually decreasing in size as it descended. The descent into and the ascent out of the pit was probably by means of a series of alternating ledges or steps, placed at right angles. This primitive kind of stairs is still used by the modern flint-miners at Brandon and in certain other parts of the country where the nature of the formation will permit. When the layer of flint most suitable for implement-making was reached galleries were thrown out in various directions along the level of the stratum of flint. In order to remove the flint the chalk above it was excavated to a height of between 3 feet and 5 feet. These galleries were found to extend to considerable distances, and in some cases they communicated with the galleries belonging to other shafts.

The chief tools employed in making these excavations were picks made by breaking off the horns of a red deer at a distance of slightly less than a foot and a half from the brow end, and afterwards removing, by means of flint flakes assisted by the action of fire, the other tines excepting only the brow tine. Many examples of picks so fashioned were discovered at different places in the shaft and also in the galleries. In form these picks closely resemble the implements of wood and iron used by the modern workman, but the labour of making deep pits through the chalk with tools of this character must have been very great.

It is worthy of note that picks of this kind, and apparently intended for mining purposes, have been found by Canon Greenwell at Eaton and Buckenham, both in Norfolk.

Another implement used in mining for flint was a kind of hatchet formed of basalt. An example of this class, $7\frac{1}{2}$ inches long and $2\frac{1}{2}$ inches wide at the cutting edge, was discovered in one of the galleries, and marks of its use in the work of excavating were abundant upon the sides of the gallery.

Canon Greenwell records the following remarkable discovery which was made during his researches at Grime's Graves. It was in connection with the working for flint by Neolithic man. The roof had given way about the middle of the first gallery, and blocked up the whole width of it to the roof. 'On removing this, and when the end came in view, it was seen that the flint had been worked out in three places at the end, forming three hollows extending beyond the chalk face at the end of the gallery. In front of two of these hollows were laid two picks, the handle of each towards the mouth of the gallery, the tines pointing towards each other, showing in all probability that they had been used respectively by a right- and a left-handed man. The day's work over, the men had laid down each his tool ready for the next day's work; meanwhile the roof had fallen in, and the picks had never been recovered. I learnt from the workmen that it would not have been safe to excavate further in that direction, the chalk at this point being broken up by cracks so as to

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prevent the roof from standing firm. It was a most impressive sight and one never to be forgotten, to look after a lapse it may be of 3,000 years upon a piece of work unfinished, with the tools of the workmen still lying where they had been placed so many centuries ago. Between the picks was the skull of a bird but none of the other bones. These two picks, as was the case with many of those found elsewhere, had upon them an incrustation of chalk, the surface of which bore the impression of the workman's fingers, the print of the skin being most apparent. This had been caused by the chalk with which the workmen's hands became coated being transferred to the handle of the pick.¹ This pick is now in the British Museum.²

In order to carry on mining of this kind it was necessary of course that Neolithic man should be provided with some kind of artificial light, and among the remains found in the pit were several rudely formed cup-shaped vessels of chalk which had apparently been used as lamps. In the pit one of these primitive lamps was found, and three others were found in the galleries. In one case the lamp was placed upon a ledge of chalk in just such a position as to throw light upon the place being worked. These lamps had all been shaped by means of flint flakes.

In the course of the investigations under Canon Greenwell's direction no less than seventy-nine picks formed of antlers were found. Upon examination the antlers so employed were found to consist mainly of those antlers which had been shed naturally by the animals rather than those belonging to animals that had been slain. There were in fact only eleven antlers of the latter kind. This leads to the conclusion that deer were abundant during the Neolithic age, and that the capture of the animal with the rude weapons then at man's disposal was a task of some difficulty.

In addition to the picks formed of antlers, two implements of bone were discovered in the shaft. The first was a bone pin $4\frac{1}{2}$ inches long, which had been split and then rubbed to a point. The second was a rounded piece of bone 1 inch in circumference and $4\frac{1}{2}$ inches in length. This had been rubbed smooth with care, and its two ends showed signs of having been used for some purpose. Both Canon Greenwell and Sir John Evans agree in the opinion that it was used as an implement for shaping arrowheads and other small objects by delicate flaking.

Besides the basalt hatchet already mentioned two rude adze-shaped tools of flint were discovered. These were also probably used for excavating purposes. Tools of this kind, as well as the basalt hatchet, were doubtless fixed in some kind of handle formed of wood, bone or antler, and so used as implements for cutting the chalk with the purpose of procuring flint.

The large numbers of water-rolled quartzite and other pebbles and flakes and waste fragments of flint point to the fact that implement-making was carried on close by the pits whence the raw material was

¹ *Journal of Ethnological Society of London* (new series), ii. p. 427.

² *The Reliquary and Illustrated Archaeologist* (1896), ii. p. 168.

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derived. Some of the pebbles bear very clear marks of having been used as hammers for flint-chipping. It is worthy of note as an indication of the methods employed by the toolmaker in the Neolithic age, that many of these used pebbles were quite small, one being only an inch and a half long. Possibly they may have been used as punches, and so helped to produce those elastic blows which are generally considered to be an essential condition of successful flaking. Several large fragments of flint, apparently disused cores, were found which had been used as hammer-stones, and it is not unlikely that they were used in connection with the quartzite pebbles in the manufacture of implements.

In the course of Canon Greenwell's excavations the discovery was made of some fragments of chalk which had been sculptured in the form of a human leg or arm, etc. These had been shaped by means of flint flakes, and they certainly present an interesting piece of evidence of the state of artistic skill of man in Neolithic times.

Bones broken in order that the marrow might be extracted, have been mentioned among the objects discovered. Upon close examination they were found to be those of a small species of ox, probably *Bos longifrons*. Moreover they were found to be the bones of very young calves, and this circumstance is of great importance as it tends to show that milk formed a large part of the food of the ancient people associated with the digging of these pits. It was this which led them to kill the calves at such an early age. Bones of other animals include those of the goat or sheep, horse, pig and red deer. The dog was represented by several bones, apparently those of old animals, and the inference is that when on account of their age they were no longer useful for hunting they were made to serve as food.

The importance of the evidence afforded by the discoveries at Grime's Graves is so great, especially as illustrating early man's methods of obtaining flint and making implements, that a few further deductions may not improperly be given.

The period to which the excavations may be unhesitatingly referred is that known as the Neolithic age, and probably it was towards the end of that age. Had it been early in the Neolithic age we should hardly have expected to find evidences of so extensive and so elaborate flint-mining. On the other hand if it had been the work of the Bronze age it is inconceivable that some articles of bronze, bartered for the excellent flint for which the place must have acquired a wide reputation, should not have been found.

Again all the evidence shows that the operations of flint-mining were carried on for a long period. The antlers used as picks point to a tedious and laborious method of excavating, whilst the contents of the filled-up pits are so much mixed with broken bones and other refuse as to lead to the conclusion that they were in fact used as receptacles for rubbish from the human dwellings situated close by them.

The sites selected for habitations in the Neolithic age seem to have been always such as were naturally well drained. The summits of hills

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or the sides of valleys were the favourite situations. In the numerous small depressions called hut-circles, which are now found on the surface of the ground in Norfolk and other parts of England, we see all that remains of the dwellings in which Neolithic families lived. These hut-circles generally occur in clusters, but sometimes singly. The depression in the ground is surrounded by an annular mound composed of the removed earth, and generally broken at one point where the entrance to the hut was situated. The construction of this mound was probably the first step towards making a Neolithic house. The next step was to build over the hollow a kind of beehive hut made of intertwined branches. In the case of the smaller dwellings this was accomplished without difficulty, but when the hut was made upon a large scale with a diameter of twenty feet or upwards a conical mound in the centre is generally found, and this was apparently intended to receive a central support such as the stem or bough of a tree.

The purposes of making the depression of the ground were obviously to procure sufficient head-room and some degree of warmth, and the encircling mound was clearly intended to throw off the rain which fell upon the roof.

The inflammable character of such a structure as this rendered it impossible to have within the hut such a fire as would be necessary for cooking purposes without incurring a great danger of setting the whole dwelling alight. The cooking-fire was therefore made outside the hut¹ at a convenient and safe distance from it. Remains of such fires have been found in exactly this relation to the floors of Neolithic dwellings,² and from the marks of great heat and the amount of charcoal found within them it is evident that cooking was carried on in Neolithic times in much the same way as among some modern savages, the ground being made sufficiently hot by long continued firing to cook whole animals.

The methods of hut-building varied in different places according to the nature of the soil and the supply of materials.

Many examples of these ancient hut-floors have been discovered in Norfolk. One of the most important groups of such floors is at Weybourne, and has been well described by the late Mr. Henry Harrod, F.S.A. His account, which was published by the Norfolk and Norwich Archæological Society,³ contains much valuable information.

The Weybourne pits, several hundreds in number, are situated upon a sandy bed, and but for the fact that they were constructed with great care there is no doubt they would have been destroyed long ago by the influences of the weather. In making the pits one uniform plan seems to have been adopted. A ridge of stones was first placed around the space to be dug out. The soil from the interior was then thrown out, and the

¹ W. Boyd Dawkins, *Early Man in Britain*, p. 273.

² G. Clinch, 'Prehistoric Man in the neighbourhood of the Kent and Surrey Border : Neolithic Age,' *Journal of the Anthropological Institute* (new series), ii. pp. 127, 134.

³ *Norfolk Archæology*, iii. pp. 232-40.

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circle of stones prevented it from falling again into the pit. The size of these pits varies considerably. The diameter ranges from 8 to 20 feet and the depth from 2 to 6 feet ; but the average size is one having a diameter of 12 feet and a depth of 3 feet.

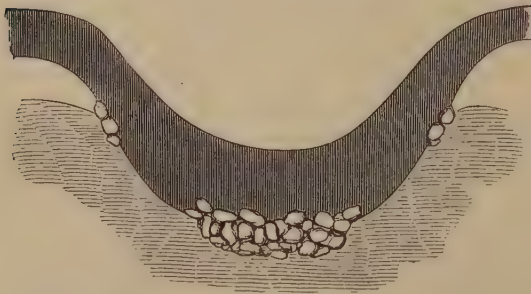


THE WEYBOURNE PITS.

During the exploration of these interesting sites by Mr. Harrod numerous trenches were cut in different directions through the pits, and it was found that large numbers of stones, some of which may have been used for lining the interior, were found at the bottom of the excavations. The stones had in some cases been brought from the beach nearly two miles distant, and had evidently been selected for the special purpose of forming some kind of hearth or flooring to the dwellings. In several cases two pits had been joined together by a narrow trench, which itself had been carefully lined with stones.

In addition to the more regularly shaped depressions there are some which either have been formed with less care or have undergone subsequent disturbance. The latter is the more probable explanation, and there is every reason to conclude that they have acquired their present irregular form in consequence of the destruction of the original banks between several small pits.

There were no traces found of fires in the pits, neither were pottery



SECTION THROUGH ONE OF THE PITS AT WEYBOURNE,
SHOWING METHOD OF CONSTRUCTION.

or other antiquities discovered in the course of Mr. Harrod's explorations, but the tradition among the peasantry and the layer of vegetable soil by which the surface of the ground and the original surfaces of the floors are in every case covered point to a considerable antiquity.

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Querns and bronze celts are said to have been found near the floors, but the statement lacks that precision which would make it valuable evidence for antiquarian purposes. At the same time it must be admitted that there is no good reason why the depressions should not mark the floors of huts of Neolithic or some subsequent age.

Depressions in the ground indicating the sites of ancient dwellings and probably of the Neolithic age have been found at Roughton Heath, Beeston Heath, Edgefield, Marsham Heath, Mousehold, and Eaton Heath. The precise periods to which they may be assigned however cannot be determined without careful and systematic exploration.

The inhabitants of Norfolk in the Neolithic age were farmers and herdsmen. They possessed domesticated animals, and this was one of their most reliable sources of food supply. They had a rudimentary knowledge of the potter's art and were well acquainted with spinning and possibly with weaving. They were able to construct canoes and seaworthy boats. Their dress consisted partly of the natural skins of animals and partly of the productions of the spindle and distaff, and their personal ornaments included beads and pendants of jet, amber, bone, etc. The dead were buried in a contracted posture near the surface of the ground, and a long oval-shaped mound or barrow was afterwards deposited over the site. Weapons and other articles were usually buried with the dead body, and this has led to the inference that this primitive people had a belief in a future state of existence after death.

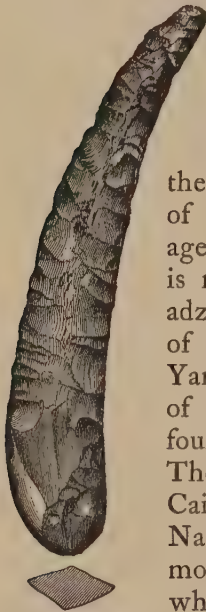
The Neolithic man was of small stature, generally standing about 5 feet 5 inches high. His skull was long or oval in shape and of fair capacity. The length of the skull, which is one of the most characteristic marks of the race, was produced by a development at the back of the head. The face was oval in outline and the cheekbones only slightly developed. The forehead was low and the nose aquiline. The modern Basques present the nearest resemblance to this ancient race, and they are generally considered to have descended from it.

Some of the defensive earthworks in various parts of England usually known as camps are supposed upon reasonable grounds to represent the strongholds in which Neolithic men entrenched themselves, their families and their cattle, but the difficulty of determining the period to which the earthworks belong is much increased by the fact that they have been occupied by successive races, and further that no excavations or minute examinations of them upon a sufficiently extensive scale have yet been made. The latter remark is particularly true of the earthworks of Norfolk, few of which can with any degree of probability be referred to a period earlier than the Roman occupation. The camps at Tasburgh and Fakenham, however, are probably pre-Roman works.

Remains of the Neolithic age, in the form of chipped and ground flint and occasionally other stone, are abundant in many parts of England, particularly in those districts where flint occurs naturally. Norfolk is no exception to this rule, and the recorded discoveries are too numerous for particular mention. The following, however, is a list of the more im-

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portant finds. Celts of elongated form and partially ground to a smooth surface have been found at Stanford,¹ Dunham and Thorpe; another form in which the cutting edge is expanding and the sides somewhat hollowed was found at Heckingham Common.² Celts ground entirely have been found at the following places:—Aylsham,³ Barton Bendish⁴ (celt now in the British Museum), Beachamwell,⁵ Blofield,⁶ a locality⁷ near Great Yarmouth, Breckles,⁸ Dull's Lane⁹ near Loddon, Elsing,¹⁰ Hilgay Fen,¹¹ Hunstanton,¹² Lopham Ford,¹³ Narborough,¹⁴ Oxborough,¹⁵ Pentney,¹⁶ Swannington,¹⁷ Thetford,¹⁸ Trimingham,¹⁹ Westacre Hall,²⁰ Weston,²¹ and Wereham.²² Two of these celts, viz. those found at Thetford and Wereham, had been perforated. A perforated axe 8 inches long was found at Tasburgh.²³ A celt well chipped but not ground was found



NEOLITHIC IMPLEMENT, YARMOUTH.

at Thetford,²⁴ and roughly chipped specimens were discovered at Little Dunham²⁵ and Norwich.²⁶ One roughly made triangular celt of dark brown flint procured near Thetford²⁷ is of particular interest from the fact that it is of a form rare in England but common in Denmark, and may probably be considered therefore to point to communication between the continent of Europe and the inhabitants of Norfolk in the Neolithic age. Another triangular celt of porphyry found at Necton²⁸ is now in the Norwich Museum. A thin, nearly flat adze was found at Thetford.²⁹ A knife beautifully formed of flint was found on Corton Beach³⁰ midway between Yarmouth and Lowestoft. Other miscellaneous antiquities of the Neolithic age found in Norfolk were a stone ball found at Cromer,³¹ a flake ground at the edges found at Thetford,³² hammer-stones found at the following places: Caister,³³ Congham,³⁴ Harleston,³⁵ Hilgay Fen,³⁶ Lyng,³⁷ Narford,³⁸ Rockhill,³⁹ Sporle⁴⁰ near Swaffham, and Yarmouth⁴¹; a felstone celt retaining marks of the handle by which it was used was found at Pentney,⁴² and a fine chipped pick 6 inches in length was found at Feltwell.⁴³

Arrowheads shaped by careful and skilful chipping have been found in Norfolk as well as other of the eastern counties in some abundance, and they have in the present instance been put towards the end of the list of articles formed of flint because there is good reason

¹ Evans, *Ancient Stone Implements*, ed. 2, p. 91.

² *Op. cit.* p. 103

³ " 100

⁴ " 100

⁵ " 100

⁶ " 100

⁷ " 100

⁸ " 100

⁹ " 125

¹⁰ " 100

¹¹ " 100

¹² " 150

¹³ *Op. cit.* p. 107

¹⁴ " 100

¹⁵ " 100

¹⁶ " 103

¹⁷ " 110

¹⁸ " 142

¹⁹ " 100

²⁰ " 102

²¹ " 90

²² " 142

²³ " 200

²⁴ *Op. cit.* p. 75

²⁵ " 70

²⁶ " 77

²⁷ " 69

²⁸ " 202

²⁹ " 92

³⁰ " 356

³¹ " 353

³² " 291

³³ " 229

³⁴ *Op. cit.* p. 229

³⁵ " 228

³⁶ " 225

³⁷ " 229

³⁸ " 231

³⁹ " 223

⁴⁰ " 229

⁴¹ " 229

⁴² " 151

⁴³ " 174

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to assign some of them, particularly those which bear marks of very elaborate work, to the Bronze age rather than to the Neolithic age.

Arrowheads are recorded as having been found at the following places in Norfolk: Attleborough,¹ Aylsham,² Necton,³ Panxworth,⁴ Thetford⁵ and Weeting.⁶ The last example was found upon a barrow in which it had probably been deposited.

NORFOLK IN THE BRONZE AGE

Of the various changes which have occurred in the social and industrial phases of the history of the human race in ancient times probably none was greater than that which was produced by the introduction of metal and the knowledge of the art of working it. The discovery of the secret of extracting copper and tin from their natural ores produced results which revolutionized the earlier methods of warfare and the chase, and the arts of the carpenter and the builder, and many other pursuits.⁷

Hitherto the inhabitants of our island during what is known as the Neolithic age had lived without the knowledge of metals, and with but limited means of intercourse with the people who inhabited the continent of Europe. When bronze was introduced into their island however it was by a new race of Aryan origin, the Goidels or Gaels, an important branch of that great Celtic family of which many traces remain in the present inhabitants of Scotland, Ireland, Wales and the Isle of Man.

Everything points to the conclusion that when bronze implements were introduced, the earliest forms of which were flat celts, and perhaps small hand daggers, the art of working and successfully blending copper and tin, so as to produce hard bronze, had reached some degree of perfection. When this secret became known, the discovery of the metallic ores in their natural state probably soon followed, but in the earlier part of the Bronze age the metal was doubtless scarce and regarded as a valuable possession. In process of time when bronze could be procured in sufficient quantity, it would be a natural desire to reproduce in metal the heavy stone celts which had hitherto been the common form of large weapon in use. For this purpose it was natural to use an actual stone celt to serve as the model for a mould for the bronze casting; and as some knowledge of casting was already possessed it would be a comparatively easy task to produce metal celts of this kind. The remains of the Bronze age comprise celts of metal which have evidently been cast in this way from stone originals, and they have been considered to represent the earliest form in which metal celts were made.⁸ The objection to such a theory is that they would require a large amount of metal at a time when it was

¹ Evans, *Ancient Stone Implements*, ed. 2, p. 390. ² *Op. cit.* p. 381. ³ *Op. cit.* p. 307.

⁴ *Norfolk Archaeology*, viii. p. 327.

⁵ Evans, *Ancient Stone Implements*, ed. 2, p. 385.

⁶ *Norfolk Archaeology*, iv. p. 361.

⁷ Munro, *Prehistoric Scotland*, p. 177.

⁸ Wilde, *Catalogue of the Museum of the Royal Irish Academy*, p. 366; Evans, *Ancient Bronze Implements*, p. 40.

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scarce, and one feels inclined rather to regard them as indications of a period when bronze was procurable in some plenty.

Hoard of bronze are among the most suggestive and important as they are also the most characteristic of the remains of the Bronze age.



BRONZE TOOLS FOUND AT CARLTON RODE.

These hoards are capable of being divided into three groups. First there are the collections of broken, damaged and worn-out implements, formed perhaps by an individual for the purpose of barter with a bronze-worker. Doubtless such a hoard represents considerable wealth. Another class consists of hoards that consist solely of broken implements, together with broken lumps of copper. Others again consist entirely of new and unworn tools. From the fact that these implements sometimes have not been freed from the irregularities and excrescences arising from the operation of casting, it is obvious that the hoards of this kind represent

the stock of a worker in bronze. The occurrence of bronze hoards of these classes is of considerable importance as showing, first that the metal was of great value, and when an implement was damaged or worn out it was saved in order to be melted down again ; secondly it shows that the founding of articles of bronze was the special trade of certain individuals ; and lastly it indicates that no sufficiently strong building existed in which the metal could be safely stored, and that as a consequence the possessor was compelled to hide it in a secret place underground.



BRONZE TOOLS FOUND AT CARLTON RODE.

Among the remains of the Bronze age in Norfolk we find examples of both classes of hoards. One of the most important discoveries of its

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kind was that of the famous Carlton Rode hoard.¹ At this place, situated about three miles south of Attleborough, a labourer employed in digging a ditch in or about the year 1845, turned up a hoard of bronze implements, etc., comprising four gouges, three of which were furnished with sockets and one with a shank to be inserted in a handle. There were also bronze punches, palstaves, a hammer, chisels, celts and portions of celts, and several pieces of metal.



BRONZE PALSTAVE
FOUND AT STIBBARD.

The association of celts with so many forms of mechanical tools suggests that the former were not invariably used for fighting purposes, but that they were used in hewing or roughly shaping wood. The hoard indeed may well have comprised the working tools of a carpenter of the Bronze age. The gouge furnished with a shank was doubtless intended to be fixed in a wooden handle and used, as the modern carpenter uses a similar tool, in the hands without the assistance of a mallet.

Another remarkable Norfolk hoard was that discovered at Stibbard² near Fakenham in 1837. This was essentially the hoard of a bronze-merchant or a bronze-worker, as the implements, eighty in all, were fresh from the moulds, many of them still retaining the marks of the seams of the moulds. Seventy of the objects found were palstaves, and although many of them seemed similar in form and size yet when tested it was found that no two were precisely alike. It is evident therefore that new or at any rate different moulds were used for each.

Ten of the articles found were spearheads, and one of them now in the British Museum has been described by the late Sir A. Wollaston Franks³ as having been formed in a mould which consisted of four parts besides the core.

The methods employed in casting articles in bronze in this early age were very ingenious. In some cases it appears that when a mould of a good pattern was obtained numerous implements were cast, but that in order to preserve the mould from damage by too frequent use a model was sometimes cast in lead, which was then made to serve as the pattern for the making of moulds in clay, which were made in two pieces.

Other hoards of bronze found in Norfolk are those



BRONZE SPEARHEAD
FOUND AT STIBBARD.

¹ Evans, *Bronze Implements*, pp. 78, 94, 113, 119, 121, 122, 133, 167, 171, 173, 175, 178, 424, 467; *Archæological Journal*, ii. p. 80; *Archæologia*, xxxi. p. 494; *Archæological Association Journal*, i. p. 59; C. R. Smith, *Collectanea Antiqua*, i. p. 105.

² Evans, *Bronze Implements*, pp. 84, 328, 457, 464; *Archæological Institute 'Norwich Volume,'* xxvi.

³ *Horæ Ferales*, p. 154, pl. vi. fig. 22.

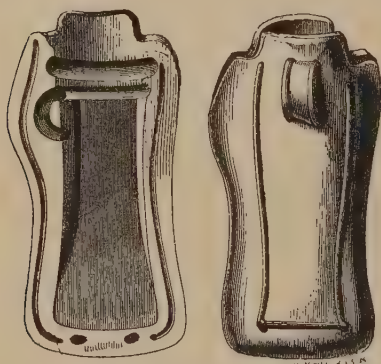
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at Eaton¹ near Norwich, comprising a mould for a socketed celt, eleven celts, and fragments of weapons; Hellesdon Hall² Norwich, socketed celts and fragments of bronze; Reepham³ and Stoke Ferry,⁴ leaf-shaped blade of halberd, two swords, about 23 inches in length and furnished with seven rivet-holes, a chape of a form unique in England, spearheads and broken swords.

A second and more important find of bronze objects, made at Eaton in 1885, was exhibited and described by Dr. Boyd Dawkins at a meeting of the Society of Antiquaries of London.⁵ The hoard contained no less than seventeen socketed celts, three swords, ten spearheads, together with chisels, gouge, knives, macehead, palstave, and various other objects, the use of which it was not possible to define with precision. The antiquities, which were found 6 feet below the surface of the ground, subsequently passed into the collection of the late Mr. J. J. Colman.

Many separate discoveries of bronze objects have been made in Norfolk at various times. These include sickles, one of which was found at Dereham,⁶ another is in the Norwich Museum, and a third was exhibited at a meeting of the Archæological Institute⁷ in 1851; a dagger-blade found in association with a contracted male skeleton, a necklace of amber beads, and some articles made of thin plates of gold at Little Cressingham⁸; a rapier-blade found at Methwold,⁹ furnished with notches at the base instead of holes for the purpose of receiving the rivets (now in Canon Greenwell's collection); a sword-blade found in

the River Ouse¹⁰ near Thetford, evidently intended for thrusting rather than striking.



BRONZE CELT-MOULD FOUND IN UNTHANKS
ROAD, NORWICH.

Several of the bronze objects of Norfolk furnish interesting examples of ornamentation. A celt found at Caston¹¹ has three raised ribs terminating in pellets. Another, found at Frettenham,¹² has four ribs. Yet another, found at Rougham,¹³ has a small stop-ridge, and the lower part is ornamented with vertical punched lines. In the case of a socketted celt found at Frettenham Common,¹⁴ and it is supposed procured

from a tumulus, we find a remarkable example of the survival of a form

¹ Evans, *Ancient Bronze Implements*, p. 447; *Archæologia*, xxii. p. 424; *Archæological Journal*, vi. p. 387; *Archæological Institute, Norwich Volume*, p. xxvi.

² Evans, *Ancient Bronze Implements*, p. 424; *Archæologia*, v. p. 116.

³ Evans, *Ancient Bronze Implements*, p. 466; *Archæologia*, v. p. 116.

⁴ Evans, *Ancient Bronze Implements*, pp. 270, 282, 305, 314, 465.

⁵ *Proceedings of the Society of Antiquaries of London*, 2nd ser., xi. 42-52.

⁶ *Op. cit.* p. 199.

⁷ *Archæological Journal*, viii. p. 191.

⁸ Evans, *Ancient Bronze Implements*, p. 244; *Proceedings of the Society of Antiquaries of London*, 2nd ser. iv. p. 456; *Archæologia*, xliii. p. 454, fig. 158.

⁹ Evans, *Ancient Bronze Implements*, p. 249.

¹⁰ *Op. cit.* p. 250.

¹¹ *Op. cit.* p. 121.

¹² *Op. cit.* p. 120.

¹³ *Op. cit.* p. 73.

¹⁴ *Op. cit.* p. 131.

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after that form had ceased to be of use. The flanges common in earlier forms are there represented by somewhat hollowed oval projections on each side of the blade. A bronze celt-mould was found in Unthinks Road near Norwich.¹

Of the buildings erected by man during the Bronze age not much is certainly known. His domestic buildings were probably constructed upon practically the same lines as those of the Neolithic tribes ; and it is not improbable that a certain proportion of the hut-circles attributed to the Neolithic age really belong to that of Bronze. The possession of improved tools for working timber, such as bronze axes, gouges, chisels, etc. would suggest however that the dwellings of the later age were more commodious and more perfectly constructed than those of Neolithic times. In the Bronze age moreover advantage was taken of lakes and rivers by building crannoges or artificial islands, which although damp and unhealthy furnished some compensating advantages in the way of protection from unwelcome visitors. The art of dressing stone and rearing gigantic structures of massive rocks was possessed by this race, as is clearly shown by the marvellous works at Stonehenge, which there is good reason to believe were constructed towards the end of the Bronze age.

In various departments of human advancement and civilization the people who used bronze exhibit a distinct advance upon those who, at an earlier period, had been furnished only with implements of stone. In husbandry this advance is indicated by the use of bronze reaping-hooks, by the employment of oxen in ploughing, and by the cultivation of several plants, such as beans and oats, which had not previously been made to minister to the wants of man. Bronze age man seems to have possessed the knowledge of working the lathe and of shaping vessels of amber and of gold. Spinning, weaving and pottery-making were well-known arts. The costume of Bronze age man comprised articles of linen and woollen homespun in the form of cloaks, caps, leggings and sandals. Personal ornaments of this age consisted of beads, earrings, necklaces, bracelets, collars and coronets made of gold, stone, glass, bronze or bone. Examples of personal ornaments in gold of this period have been found at Ashill,² Downham,³ and Foulsham.⁴ The objects, consisting of two torques or collars and one armilla, are of the usual twisted pattern.

The graves or sepulchral barrows of this age, generally speaking, were circular in form and intended for the interment of the cremated remains of only one person, whilst the oval barrows of the Neolithic age were constructed for several interments and sometimes furnished with a central chamber of stone.

Men of the Bronze age appear to have worshipped the heavenly bodies, and the temples of Avebury and Stonehenge are considered by some archæologists to have been associated with the religious rites in connection therewith.

¹ Archaeological Institute, *Norwich Volume*, xxvi.

² *Norfolk Archæology*, v. 193.

³ *Op. cit.* i. 231.

⁴ *Op. cit.* i. 231.

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An important discovery made at Little Cressingham¹ in 1849, consisting of a skeleton accompanied by a dagger and javelin-head of bronze, a gold breastplate, a gold armilla, and a small flat circular box and portions of two other boxes all of gold, together with a large number of amber beads many of which were broken, is regarded as an interment of the Bronze age. Another explanation of these box-like objects of gold is that they were 'the coverings of discs of wood perforated horizontally, and thus forming large, flat, gold-plated beads' (Evans' *Stone Implements*, ed. 2, p. 460). Other interments of an equally early period have been recorded at Broome and Ditchingham,² and Salthouse³ near Cromer.



BRONZE DAGGER FOUND AT
LITTLE CRESSINGHAM.

Another discovery of personal ornaments consisting of parts of a bone necklace is worth recording here. It was made at Feltwell Fen in the year 1876, and the late Rev. C. R. Manning⁴ in describing it mentions that it may be referred to the Bronze age.

There is reason to think that many forms of stone implements such as hammer-stones and flint arrowheads survived during a considerable part of the Bronze age, if not indeed until the prehistoric Iron age came in.

NORFOLK IN THE PREHISTORIC IRON AGE

The introduction of the knowledge of working iron which succeeded the age of Bronze is closely associated with the appearance in these islands of the Brythons, a race of Celtic origin who gave the name of Britain to the chief island of the group.

The remains of this period in Norfolk as indeed throughout the country are rare, and this may be accounted for by two simple but sufficient reasons. One is the perishable character of articles composed of iron, and the other is that the period, when compared with the duration of the Bronze age or the Neolithic age, was comparatively short.

This period, the prehistoric part of the age of Iron, was in England identical with what is known as the Late Celtic period, our knowledge of which has been greatly increased by the

¹ *Norfolk Archaeology*, iii. pp. 1, 2; Evans, *Ancient Stone Implements*, ed. 2, p. 460.

² *Norfolk Archaeology*, v. pp. 361, 362.

³ *Op. cit.* v. pp. 263-67.

⁴ *Op. cit.* viii. pp. 319-25.



LATE CELTIC HORSE-TRAPPINGS FOUND AT SAHAM TONEY (NOW IN NORWICH MUSEUM).

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EARLY MAN

researches of the late Sir A. Wollaston Franks,¹ Mr. Charles H. Read² and Mr. J. Romilly Allen.³

Broadly speaking the Brythons, who imported the knowledge of iron, still used personal ornaments of gold, and horse-trappings, etc. of bronze, whilst iron was used for weapons and implements of various kinds. Objects of this character, which have generally been discovered as hoards or in association with interments, are usually decorated with ornaments of a remarkable and peculiarly elegant character, consisting in the main of spirals and trumpet-shaped forms the source of which is involved in some obscurity.

The remains of this interesting period which immediately preceded the advent of the Romans are, as far as Norfolk is concerned, but few in number and only locally important. A discovery of horse-trappings consisting of enamelled ornament or harness, buckles and rings was made many years since at Saham Toney, one mile north-west of Walton. An account of it, with an engraving which hardly does justice to the objects, was published by the Norfolk and Norwich Archæological Society in 1849,⁴ but at that time the age of the objects was not appreciated. Another Late Celtic discovery was made at Caister between two and three miles south of Norwich. This was a bronze fibula⁵ but further details are not obtainable. There is one other object found in Norfolk which is probably of Late Celtic workmanship. This is a pot nearly 10 inches high made of beaten bronze and shaped much like the coarse domestic ware in common use by the Britons at and for some time after the coming of the Romans. The pot which was acquired by the Trustees of the British Museum in 1900, is described as having been found at Mundesley 13 feet deep in gravel, and was therefore probably associated with an interment. Several coarse earthen pots of similar form but of larger size have been found at Silchester.⁶

COINS OF THE ANCIENT BRITONS

Coins of the prehistoric period have been found in several parts of Norfolk. They appear to be in most if not all cases feeble imitations of the beautiful pieces struck by Philip II. of Macedon in the fourth century B.C. These were impressed on the obverse with the laureate head of Apollo, and on the reverse with the representation, skilfully delineated, of a charioteer standing in a biga which was drawn by two horses, and inscribed underneath with the name of the famous king by whom they were struck.

The design seems to have been universally admired, and was repeatedly copied on subsequent coins. In fact it was copied so much

¹ *Horæ Ferales*, the standard work on Late Celtic art.

² *Parl. Return on Celtic Ornaments found in Ireland*, 1899, p. 8.

³ Notes on Late Celtic Art, *Archæologia Cambrensis*, 5th ser. xiii. pp. 212-32, 321-36, etc.

⁴ *Norfolk Archæology*, ii. pp. 398-400; *Archæologia Cambrensis*, 5th ser. xiii. p. 327.

⁵ *Op. cit.* p. 327.

⁶ *Archæologia*, lvii. p. 97, fig. 3, central pot in the group.

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and underwent so many changes and modifications in the process that the original Macedonian coin is scarcely recognizable in the feeble imitations on the coins in circulation among the Britons in pre-Roman times.

The word ECEN which is found inscribed upon some of the coins found in the eastern counties has been identified by Sir John Evans¹ with the Icenī, the tribe which inhabited what are now Norfolk, Suffolk and parts of adjacent counties. The early coins of this district indeed possess certain well-marked peculiarities which distinguish them as the currency of an independent tribe. Particulars of the various coins found at the following localities in Norfolk will be found in the topographical list at the end of this article : Bressingham, Brettingham, Brunstead, Cawston, Norwich, and Thetford.

ANCIENT ROADS

The difficulty of assigning the ancient earthworks of Norfolk to a precise period has already been pointed out. An equally difficult task lies before one who attempts to define the origin and ages of the ancient roads of which considerable traces remain in the county.

The Padders' Way, or the Peddars' Road, as it is denominated on the Ordnance Survey maps, is however unquestionably one of the oldest roads in Norfolk. It extends from Holme near Hunstanton in a south south-eastern direction through a considerable part of the county, passing quite near Ringstead, and further on a little to the west of Fring. It next passes on the east side of Anmer. From thence it extends to the ancient earthworks of Castle Acre, a point at which several roads from different directions meet. Southward from this place its course is not so clearly marked, but Mr. E. M. Beloe,² F.S.A., has been able to identify it at several points further south.

The Great Fen Road is another of the ancient roads which in part of its course runs through Norfolk, but it is doubtful if it existed before the Roman period.

Doubtless the Romans on their arrival in Norfolk made use of the ancient roads which they found in existence. With the appearance of the Romans however the prehistoric period ends.

TOPOGRAPHICAL LIST OF PREHISTORIC ANTIQUITIES IN NORFOLK

In the following list an attempt is made to record the various sites in Norfolk which have furnished prehistoric antiquities. The following abbreviations in the references to authorities have been adopted :—

E.A. = *The East Anglian*.

Evans B. = *The Ancient Bronze Implements, Weapons and Ornaments of Great Britain*, by John Evans, 1881.

¹ *The Coins of the Ancient Britons*, 1864, pp. 357, 358.

² 'The Padders' Way and its attendant Roads,' *Cambridge Antiquarian Society, Communications*, ix. pp. 77-96.



LATE CELTIC POT FOUND AT MUNDESLEY (NOW IN THE BRITISH MUSEUM)

EARLY MAN

Evans C. = *The Coins of the Ancient Britons*, 1864, and *Supplement*, 1890, by John Evans, F.S.A.

Evans S. = *The Ancient Stone Implements, Weapons and Ornaments of Great Britain*, ed. 2, by Sir John Evans, 1897.

N.A. = Norfolk Archæology (*The Transactions of the Norfolk and Norwich Archæological Society*).

D. Turner = Dawson Turner's collection of drawings, engravings, etc., illustrative of Blomefield's *History of Norfolk*, British Museum Additional MSS. 23,024-23,062.

ALBURGH.—Tumulus near Alburgh church upon being opened was found to contain human bones. Period doubtful, but probably prehistoric [*E.A.*, i. 89].

ASHILL.—Gold torque of twisted pattern; Bronze age [*N.A.*, v. 193, with illustrations].

ATTLEBOROUGH.—Neolithic celts, chipped and ground at edges [*D. Turner, Add. MS.* 23,053, fos. 39, 40]. Perforated stone hammer [*D. Turner, Add. MS.* 23,053, fo. 38].

Barbed and stemmed arrowhead [*Evans S.*, 390]. Bronze palstave [*Evans B.*, 77].

AYLMERTON, Gallows Corner.—Palæolithic implement [*Evans S.*, 572].

AYLSHAM.—Ground flint celt [*Evans S.*, 100]. Chipped flint arrowhead, with sides curved outwards [*Evans S.*, 381].

BARTON BENDISH.—Ground flint celt (Neolithic) [*Evans S.*, 100].

BERGH APTON, or BURGH APTON.—Tumuli, funereal urn, sword (? bronze) and stone celt (the last now in British Museum) [*N.A.*, v. 180-184].

BIRCHAM MAGNA.—Bronze Age barrows containing gold beads, bronze pin, etc. [F. C. Lukis, *Brief Account of the Barrows near Bircham Magna, Norfolk*, 1843, pp. 13, 14.]

BLOFIELD.—Ground flint celt [*N.A.*, viii. 329].

BRADSTON.—Urns of imperfectly baked clay, possibly of the Romano-British period [*E.A.*, i. 134].

BRANDON.—Neolithic flint-mines and numerous implements found in and near them at Grimes' Graves. See description in the foregoing article on 'Early Man.'

BRECKLES.—Ground flint celt [*Evans S.*, 100].

BRESSINGHAM.—Coin of rare type [*Evans C.*, p. 71, pl. C. No 2].

BRETENHAM.—Coin of Cunobulin [*Evans C.*, p. 571, pl. xxii. No. 10]. This coin is now in the cabinet of Sir John Evans, K.C.B.

BROOME.—Tumuli, probably of the Bronze age [*N.A.*, v. 361, 362].

BRUNSTEAD.—An uninscribed gold coin [*Evans C.*, p. 443, pl. K. No. 4].

BUCKENHAM.—Stag's-horn pick, of Neolithic age [*Evans S.*, 34]. Tumulus, probably of prehistoric age [*Athenæum*, May 11, 1901, p. 599].

BURSTON.—Palæolithic implement [*N.A.*, ix. 363].

BUXTON COMMON.—Barrow containing a funereal urn of imperfectly burnt clay and bones [*Archæologia*, xiii. 404].

CAISTER near GREAT YARMOUTH.—Quartzite hammerhead [*Evans S.*, 229].

CARLTON RODE.—Important hoard of bronze implements, including gouges, chisels, etc. [*Evans B.*, 78, 94, 113, 119, 121, 122, 133, 167, 171, 173, 175, 178, 424, 467; *Archæological Journal*, ii. 80; *Archæologia*, xxxi. 494; *Archæological Association Journal*, i. 59; C. R. Smith, *Coll. Antiq.*, i. 105].

CASTLE ACRE.—Cinerary urn of pre-Roman age, in possession of Mr. Plowright, of Swaffham. Information supplied by Mr. G. E. Fox, F.S.A.

CASTLE RISING.—Four bronze celts [Archæological Institute, *Norwich Volume*, p. xxvi.].

CASTON.—Bronze socketed and looped celt [*Evans B.*, 121].

CAWSTON.—Gold coin of the Iceni type [*Evans C.*, p. 579, pl. xiv. No. 14].

COLNEY.—Cinerary urn, found inverted and filled with ashes, probably pre-Roman [*Archæologia*, xiv. pp. 1-6; Archæological Institute, *Norwich Volume*, p. xxv.].

COLTISHALL.—Urn of coarse ware, probably prehistoric, found in 1850 [*D. Turner, Add. MS.*, 23,054, fo. 84; *N.A.*, iii. 426].

CONGHAM.—Quartzite hammerhead [*Evans S.*, 229].

CRESSINGHAM.—Bronze age interment. A male skeleton in contracted posture accompanied by breastplate, armilla, and circular box-like objects of gold, amber beads and pendants, and bronze dagger and javelin-head [*Evans S.*, 460; *Evans B.*, 244; *Archæologia*, xliii. 454, 528; *Proc. Soc. Antiq. Lond.*, ser. 2. iv. 456; *D. Turner, Add. MS.*, 23,054, fo. 98].

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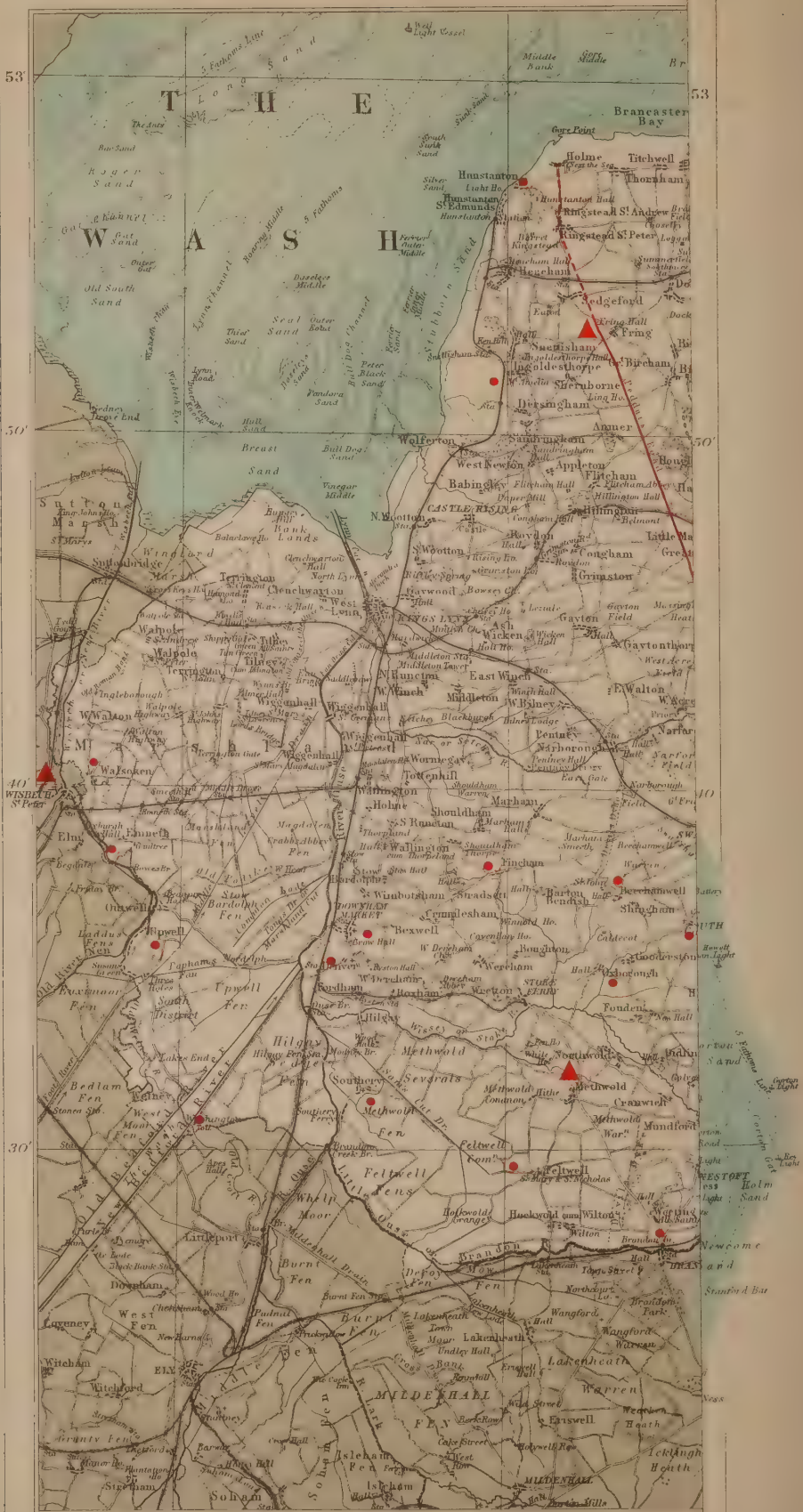
- CROMER.—Stone ball, Neolithic [*Evans S.*, 253]. Barrow containing burnt bones and long thin jet beads of Neolithic age [*Evans S.*, 463; *Archæological Journal*, vii. 190]. Neolithic implement found at Lighthouse Hill [*N.A.*, viii. 336]. Bronze celt found in 1849 in the cliff at Cromer [*D. Turner, Add. MS.*, 23,054, fo. 107].
- DEREHAM.—Bronze age sickle with the external edge of the blade extending across the end of the socket, and both edges of the blade sharp [*Evans B.*, 199].
- DEREHAM, EAST.—Fine bronze sword [*N.A.*, iv. 355].
- DISS.—Neolithic implements, now in Norwich Museum [*Jarrol's Norwich Castle Guide*; also *N.A.*, iv. 311].
- DITCHINGHAM.—Tumuli, probably of the Bronze age [*N.A.*, v. 361, 362].
- DOWNHAM.—Gold armilla, melted down before 1846 [*N.A.*, i. 235].
- DRAYTON.—Neolithic flint celt [*N.A.*, ix. 368].
- DUNHAM.—Ground celt, Neolithic [*Evans S.*, 91]. Roughly chipped celt, Neolithic [*Evans S.*, 70]. Neolithic implements in Norwich Museum [*Jarrol's Norwich Castle Guide*].
- EATON.—Picks of stag's-horn of Neolithic age [*Evans S.*, 34]. Hoard of bronze spear-heads, celt-mould, and fragments of weapons found in digging up the roots of an ash tree [*Archæologia*, xxii. 424; *Evans B.*, 447, 468; *Archæological Journal*, vi. 387; *Archæological Institute, Norwich Volume*, p. xxvi.]. Hoard of bronze objects found in 1885 [*Proceedings of the Society of Antiquaries of London*, 2nd ser. xi. 42-52].
- EDGEFIELD.—Stone celt and small pits, probably Neolithic hut-circles [*N.A.*, iii. 237-238].
- ELSING.—Ground celt of Neolithic age [*Evans S.*, 100].
- FELTWELL.—Unground flint chisel of Neolithic age [*Evans S.*, 174]. Flat pieces of bone, parts of personal ornament, of Neolithic age [*N.A.*, viii. 319, etc.; *Evans S.*, 458].
- SHRUB HILL.—Greenstone celt and Neolithic arrowhead [*Evans S.*, 96, 390]. Palæolithic implements [*Evans S.*, 550, 568, 569].
- FLITCHAM.—Tumulus, possibly prehistoric [*N.A.*, ix. 65].
- FOULSHAM.—Gold torque [*N.A.*, i. 331; *Archæological Institute, Norwich Volume*, p. xxix.].
- FRANSHAM.—Neolithic implements [*Archæological Institute, Norwich Volume*, p. xxv.].
- FRETENHAM.—Socketed and looped bronze celt, and bronze palstave [*Evans B.*, 120, 131]. Two bronze celts [*N.A.*, viii. 327; *Archæological Institute, Norwich Volume*, p. xxvi.]. Tumulus of doubtful age [*N.A.*, v. 357].
- FULMODESTON.—Flint celt, perforated hammerhead or axe, and bronze celt [*Archæological Institute, Norwich Volume*, p. xxv.].
- GELDESTONE HALL.—Two bands of thin gold, perhaps of Bronze age [*N.A.*, iv. 312].
- GOODERSTONE.—Stone celts (?) [*N.A.*, iii. 421].
- GREAT CARBROOK.—Neolithic chipped flint celt, bronze palstave (described as a hammer-head, and now in Norwich Museum), bronze spearhead with two loops, bronze celt-mould, crystal bead, and portions of horse-trappings consisting of bronze ornaments, etc., gilt and enamelled, and perhaps of Late Celtic workmanship [*D. Turner, Add. MS.*, 23,054, fos. 5, 6, 8, 10, 11, 12].
- GRIME'S GRAVES.—See BRANDON.
- HANWORTH.—Broad socketed bronze celt [*Evans B.*, 114].
- HARGHAM.—Five flint celts [*Archæological Institute, Norwich Volume*, p. xxv.].
- HARLESTON.—Perforated stone hammerhead of the Neolithic age [*Evans S.*, 228].
- HECKINGHAM.—Neolithic implements, now in Norwich Museum [*Jarrol's Norwich Castle Guide*]. Large ground celt, expanding at the edge, of Neolithic age [*Evans S.*, 103].
- HEIGHAM.—Two bronze rings, possibly of the Roman period [*N.A.*, vi. 214, 215].
- HELSDON HALL.—See NORWICH.
- HEMPNALL.—Cemetery, probably of pre-Roman age [*N.A.*, iv. 364; *N.A.*, v. 49, etc.].
- HILGAY FEN.—Ground flint celt, Neolithic age [*Evans S.*, 100]. Greenstone hammer-head, 10 inches long, also of Neolithic age [*Evans S.*, 255].
- HOLM HALL.—Neolithic implements [*Archæological Institute, Norwich Volume*, p. xxv.].
- HUNSTANTON.—Brown flint celt, ground all over, said to have been found fixed in a tree in the submarine forest at Hunstanton. Found in 1829, and now in Norwich Museum [*Evans S.*, 150].
- HUNWORTH.—Flint celt and two bronze celts [*N.A.*, ix. 361].

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- INGHAM.—Small lancehead and socketed celts of bronze.
- LODDON, DULL'S LANE.—Neolithic celt of serpentine, 6½ inches long [*Evans S.*, 125].
- LONGHAM.—Bronze celts [*N.A.*, viii. 11].
- LOPHAM FORD.—Thin and highly-ground celt of Neolithic age [*Evans S.*, 107].
- MARHAM.—Chisel-shaped celt of flint [Archæological Institute, *Norwich Volume*, p. xxv.].
- MASSINGHAM HEATH.—Roughly-hewn flint implements of Neolithic age [*Evans S.*, 83].
Drinking cup of the pre-Roman period [*D. Turner, Add. MS.*, 23,056, fo. 164].
- METHWOLD.—Palæolithic implement [*N.A.*, ix. 363]. Bronze celt [*N.A.*, viii. 327].
Rapier-blade of bronze [*Evans B.*, 249].
- MUNDESLEY.—Bronze celt, found on beach [*N.A.*, ix. 361]. Bronze vessel of Late Celtic period, now in British Museum. See preceding article.
- NARBOROUGH.—Ground Neolithic celt [*Evans S.*, 100]. Two ground celts and one only chipped [*D. Taylor, Add. MS.*, 23,056, fos. 214, 215].
- NARFORD.—Adze, made of quartzite, of Neolithic age [*Evans S.*, 231].
- NECTON.—Neolithic perforated axe, made of porphyry, 7 inches long, now in Norwich Museum [*Evans S.*, 202]. Stemmed and barbed arrowhead, now in Norwich Museum [*Evans S.*, 390]. Chisel-shaped celt, of flint [Archæological Institute, *Norwich Volume*, xxv.].
- NEEDHAM.—Ground Neolithic celt [*N.A.*, vii. 357].
- NORTH WALSHAM.—Neolithic pick, of flint [*Evans S.*, 173].
- NORWICH.—Roughly chipped celt, Neolithic [*Evans S.*, 77]. Ground celts, of flint, said to have been found in association with human skeleton [*N.A.*, viii. 331]. Bronze celt-mould, found in Unthinks Road [Archæological Institute, *Norwich Volume*, opposite p. xxvi.].
- HELLEDON HALL.—Small hoard of bronze objects found in 1759 [*Archæologia*, v. 116; *Evans B.*, 424]. An uninscribed gold coin, now in the cabinet of Sir John Evans, K.C.B. [*Evans C.*, p. 437, pl. C. No. 3].
- ORMESBY.—Flint celt [*N.A.*, vii. 351].
- OUSE RIVER, near THETFORD.—Bronze sword-blade, 17¾ inches long [*Evans B.*, 250].
- OXBOROUGH.—Ground Neolithic celt [*Evans S.*, 100]. Several stone celts and stone bead [*N.A.*, iii. 421]. Bronze arrow or javelin-head, 2½ inches long [Archæological Institute, *Norwich Volume*, p. xxvi.].
- PANXWORTH.—Flint arrowhead [*N.A.*, viii. 327].
- PENTNEY.—Ground Neolithic celt, with faceted edge [*Evans S.*, 103, 151]. Ground Neolithic celt, found in 1849 [*D. Turner, Add. MS.*, 23,059, fo. 16].
- REDHILL.—See THETFORD.
- REEDHAM.—Bronze celt [*N.A.*, vii. 358].
- REEPHAM.—Bronze hoard, consisting of thirty-one celts and other objects [*Archæologia*, v. 114; *Evans B.*, 466].
- ROCKLAND.—Perforated hammerhead, formed of quartzite and of Neolithic age, now in Norwich Museum [*Evans S.*, 223]. Cinerary urn, of rough clay, and ornamented [*N.A.*, v. 183].
- ROUGHAM.—Bronze celt, with a stop-ridge and broad cutting edge [*Evans B.*, 73].
- ROUGHTON.—Tumuli, containing jet beads, stone ball, urn of coarse clay, and bronze pin [*N.A.*, iii. 237; *N.A.*, v. 266].
- ROYDON.—Celt of flint or bronze [*N.A.*, iv. 311].
- RUNTON.—Several rude black urns, filled with burnt bones, perhaps Romano-British [*N.A.*, v. 266]. Ovale implement, Palæolithic [*Evans S.*, 572].
- SAHAM TONEY.—Late Celtic interment [*N.A.*, ii. 399].
- SALTHOUSE.—Tumuli, said to be of Celtic period [*N.A.*, iii. 236; v. 263].
- SCOLE.—Flint or bronze celts [*N.A.*, iv. 311].
- SNETTISHAM.—Bronze palstave [*Evans B.*, 79].
- SOUTH WOOTTON.—Palæolithic implement [*Evans S.*, 572].
- SPOBLE.—Neolithic hammerhead of quartzite [*Evans B.*, 229, 240; Archæological Institute, *Norwich Volume*, p. xxv.].
- STALHAM.—Pointed Palæolithic implement, found in 'The Bloody Field' in 1853 [*D. Turner, Add. MS.*, 23,060, fo. 156].
- STANFORD.—Long flint celt of Neolithic age [*Evans S.*, 91].

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- STIBBARD.—Important hoard of bronze objects, comprising seventy palstaves and ten spearheads [*Archæological Institute, Norwich Volume*, p. xxvi. ; *Evans B.*, 84, 328, 457, 464].
- STOKE FERRY.—Blade of halberd, said to be formed of copper [*Evans B.*, 270]. Hoard of bronze objects, including swords, leaf-shaped spearheads, and blade of halberd [*Evans B.*, 282, 305, 314, 465].
- STOW BARDOLPH.—Two funereal urns, probably of the prehistoric period [*N.A.*, iii. 426].
- SWAFFHAM.—Bronze objects as follows: one palstave, two flanged celts, three socketed celts each with one loop, two spearheads, both socketed and furnished with two loops, and bronze sickle [*D. Turner, Add. MS.*, fos. 206, 207, 213].
- SWANNINGTON.—Ground Neolithic celt, said to have been found on tumulus [*Evans S.*, 110].
- TASBURGH.—Perforated axe of Neolithic age [*Evans S.*, 200 ; *Archæological Institute, Norwich Volume*, p. xxv.]. Camp, probably of the prehistoric period.
- THETFORD.—Palæolithic implements, found at Redhill [*Evans S.*, 550]. Numerous Neolithic implements. Bronze celt [*N.A.*, vii. 373]. Three Palæolithic implements, found at Whitehill [*Quarterly Journal Suffolk Institute of Archæology*, i. 4 ; *Evans S.*, 550, 556]. An uninscribed gold coin, said to have been found with four other British coins ; it is now in the cabinet of Sir John Evans, K.C.B. [*Evans C.*, p. 437, pl. C. Nos. 5, 6, 7].
- THORPE.—Ground Neolithic celt, now in Norwich Museum [*Evans S.*, 91].
- THURLTON.—Flint celts, probably of Neolithic age [*N.A.*, iv. 312].
- TRIMMINGHAM.—Ground Neolithic celt [*Evans S.*, 100].
- WATTON.—Neolithic flint celt, ground over the whole surface [*D. Turner, Add. MS.*, 23,061, fo. 147].
- WAVENEY VALLEY.—Neolithic celts [*N.A.*, iv. 312].
- WEETING.—Palæolithic implements, found in gravel at Broomhill Pit [*Evans S.*, 560]. Neolithic (or possibly Bronze age) arrowhead, of white flint, found on a tumulus [*N.A.*, 361].
- WEREHAM.—Ground Neolithic celt, of flint, with a small hole drilled through it at the butt-end for the purpose of suspension [*Evans S.*, 142].
- WEST ACRE.—Ground Neolithic celt [*Evans S.*, 102].
- WESTON.—Elongated Neolithic celt, with ground edge [*Evans S.*, 90]. Small ground Neolithic celt, with blunted edge [*Evans S.*, 139]. ‘British’ urn, containing 300 coins [*N.A.*, iv. 357]. Neolithic flint celt, finely shaped and ground over the entire surface [*D. Turner, Add. MS.*, 23,061, fo. 159].
- WEYBOURNE.—Numerous Neolithic or Bronze age hut-circles [*N.A.*, iii. 232, etc. ; vii. 170]. Two or three bronze celts [*N.A.*, iii. 236].
- WRETHAM MERE.—Lake dwellings [*N.A.*, vii. 355].
- YARMOUTH.—Stone hammerhead of Neolithic age [*Evans S.*, 229]. Ground flint celt [*Evans S.*, 100.]



ROMANO-BRITISH NORFOLK¹

1. Introductory Sketch. 2. The Iceni, Icknield Street. 3. Places of settled occupation, town or village: the two Caisters. 4. Villas and Rural Dwellings. 5. Roads. 6. Military Posts: Brancaster. 7. Miscellaneous. 8. Alphabetical list of sites in Norfolk where Roman Remains have been found.

I. INTRODUCTORY SKETCH

FROM the Briton we pass to the Roman, from the prehistoric to the verge of history. With the Roman conquest our island began to be one of the countries known to us historically, and some at least of the persons who lived in it, and the events which occurred in it, have been definitely recorded in literature. Nevertheless Roman Britain has no history of its own; for no country or person or thing can have a history unless it also possesses or has possessed a definite individuality which has existed continuously for some perceptible period of time. It is not enough that the man or thing should have existed during a period known to us from history: there must have been, in some way or other, an independent existence and an independent unit. But Britain under the rule of the Roman Empire was merely one province, and in general an unimportant province, of a vast and complex state which stretched over three continents from the shores of ocean to the sands of the eastern seas. It had, indeed, marked characteristics of its own and striking incidents took place within it, and we can describe both of these in a more or less connected sketch; but, in the full and real sense of the phrase, we cannot write a history of it.

If this is true of Roman Britain as a whole, it is still more true of the part of it with which we are now concerned, the area which to-day is known as Norfolk. For in Roman days our island was not divided into the present counties nor into any districts geographically coincident with them. Neither the boundaries of the Celtic tribes, nor those of the Roman administrative areas, so far as we know them, agree with our existing county boundaries. He who studies the Roman remains that

¹ For the following article I have searched most of the literature myself and, so far as I could, have visited the chief museums and sites. I have to thank various helpers, especially Sir John Evans, Mr. C. H. Read, Prof. Rhys, Mr. Arthur Smith, Mr. W. H. Stevenson, Dr. Jessop, Mr. E. M. Beloe and others. I have also to acknowledge my obligations to an article on Roman Norfolk by Mr. G. E. Fox, published in the *Archæological Journal* for 1889 (xli. 331-349). Though sometimes differing from Mr. Fox in my conclusions, I have benefited by his work in many points, which I have tried to indicate in detail. I have also consulted with profit the Dawson Turner drawings in the British Museum (MSS. Add. 23,013-23,062).

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have been found in any one county has to deal with a division of land which for his purpose is wholly accidental and arbitrary. Norfolk, surrounded as it is on two sides by the sea and on a third side by the marshes of Fenland, may seem to be so isolated geographically, so well equipped with natural boundaries, that it might be expected to form an exception to this rule. Yet the boundaries of Norfolk coincide neither with the boundaries of the Celtic tribe who once dwelt in its area, the Iceni, nor with any known divisions of the Romans. The phrase Roman Norfolk is convenient, but strictly speaking it is a contradiction in terms. Norfolk, to the Roman student, is a meaningless area without unity : he can describe it, but he cannot write a history of it.

With these facts in view, we propose in the following paragraphs to diverge somewhat from the plan which most county historians have followed in dealing with the Roman antiquities found in particular counties. They have generally narrated the chief events recorded by ancient writers as having occurred in Britain, and have pointed out which of these events may be supposed to have occurred within the county boundaries. They have tried to write a history : they have in reality done no more than produce a narrative of disconnected events, whilst leaving a wrong impression that somehow their county had in Roman times some sort of local individuality. We propose to begin, not with the ancient writers, but with the ancient remains, which, indeed, are now more fully known and better appreciated than they were fifty or a hundred years ago. We shall try, first, to sketch the general character of the Roman province of Britain, its military, social and economic features : we shall next point out in detail how far the Roman antiquities of Norfolk illustrate this sketch ; that is, how far the district now called Norfolk, was an average bit of Roman Britain.

The Roman occupation commenced in A.D. 43. At first its progress was rapid. Within three or four years the Romans overran all the south and midlands as far as Exeter, Shrewsbury, and Lincoln : part was annexed, part left to 'protected' native princes, among whom were the princes of the Iceni in Norfolk and Suffolk. Then came a pause : some thirty years were spent in reducing the hill tribes of Wales and Yorkshire, and during this period the 'protected' principalities were gradually absorbed. The Iceni, for instance, were definitely incorporated into the province after the failure of the great rising led by their Queen Boudicca (Boadicea) in A.D. 61. About A.D. 80 the advance into Scotland was attempted : about 124 Hadrian built his Wall from Newcastle to Carlisle, and thereafter the Roman frontier was sometimes to the north, never to the south of this line. The 'province' thus gained fell practically, though not officially, into two marked divisions, which coincide roughly with the lowlands occupied in the first years of the conquest and the hills which were tamed later. The former were the districts of settled civil life. The troops appear to have been very soon withdrawn from them, and, with a few definite exceptions, there was probably not a fort or fortress or military post throughout this part of our island. On the

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other hand, the Welsh and northern hills formed purely military districts, with forts and fortresses and roads, but with no towns or ordinary civilian life. It was the Roman practice, at least in the European provinces of the Empire, to mass the troops almost exclusively along the frontiers, and Britain was no exception. The army which garrisoned this military district was perhaps forty thousand men. It ranked as one of the chief among provincial armies, and constituted the most important element in Roman Britain. With the military district, however, we are not now concerned. For our present purpose it suffices to note its existence, in order to explain why the traces of military occupation are rare in Norfolk. But we may pause to examine the chief features of the non-military districts within which Norfolk is included. These features are not sensational. Britain was a small province, remote from Rome, and by no means wealthy. It did not reach the higher developments of city life, of culture or of commerce, which we meet in more favoured lands—in Gaul or Spain or Africa. Nevertheless, it had a character of its own.

In the first place, Britain, like all the provinces of the western Empire, became Romanized. Perhaps it became Romanized later and less perfectly than the rest. But in the end the Britons generally adopted the Roman speech and civilization, and in our island, as in all western Europe, the difference between Roman and provincial practically vanished. When the Roman rule in Britain ended about 410 A.D., the so-called 'departure of the Romans' did not mean what the end of English rule in India or of French rule in Algeria would mean. It was not an emigration of alien officials, soldiers and traders. It was administrative, not racial. Probably the country folk in the remoter parts of Britain continued to speak Celtic during the Roman period: thus much we may infer from continental analogies and from the revival of Celtic in the sixth century. But the townspeople and the educated classes appear to have used Latin, and on the side of material civilization the Roman element reigns supreme. Before the Roman period there was a Late Celtic art of considerable merit, best known for its metal work and earthenware, and distinguished for its fantastic use of plant and animal forms, its employment of the 'returning spiral' (fig. 1), and its enamelling. This art and the culture which went with it vanished before the Roman, at least in its characteristic forms. In a few places, as in the New Forest and in Northamptonshire, its products survived as local manufactures; in general it met the fate of every picturesque but semi-civilized art when confronted by an organized coherent culture. Almost every dominant feature in Romano-British life was Roman. The commonest good pottery, the so-called Samian or Terra Sigillata, was copied directly from an Italian original and shows no trace of Celtic influences; it was indeed principally imported from Gaul. The mosaic pave-



FIG. 1. LATE CELTIC ORNAMENT ILLUSTRATING THE 'RETURNING SPIRAL' (Elveden, Essex).

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and one might more properly compare them to the railways of the present day, which equally radiate from London.

Such was Roman Britain, so far as it was not military—a land of small country towns and large rural estates ; permeated by the ordinary forms of Roman civilization, though lacking its higher developments ; not devoid of mineral and agricultural resources, but certainly not rich ; a comfortable land, perhaps, but not a very important part of the Empire. With this general character of the province, or at least of its southern half, we have now to compare the details of Roman Norfolk. The comparison will both illustrate some points in the preceding sketch of the Roman province, and will at the same time show the proper value and significance of the remains discovered in the county of Norfolk. Let us anticipate summarily the result. We shall find, to begin with, that our attention is drawn to a special Celtic tribe within whose territory Norfolk originally lay. When we pass to the character of the country under the Roman occupation proper, our survey will reveal to us a district somewhat empty of remains, but in general resembling otherwise the rest of southern, non-military Britain. There was probably one country town, and perhaps one or two other sites may have been occupied by villages. There were a few ‘villas,’ and doubtless therefore some agriculture, but no other industry of importance nor any noteworthy trade route.¹ There was lastly one fort, in the north-west corner of the county, one of the very few Roman forts in southern Britain, and one which is assignable to a definite period. It is a brief record. Many parts of the county, its great heaths and sandy wastes and low-lying marshes, must have been very thinly inhabited, if inhabited at all. One great historical event may have added to the desolation. And the parts which were actually inhabited during the Roman period have been, perhaps, inadequately explored. We shall leave many blank spaces in our survey, because there were blank spaces in the land during Roman times. We shall leave many points unsettled because our present evidence is insufficient. Excavation, in particular, has been seldom attempted in Norfolk, and the absence of this important aid will be sadly perceptible to anyone who examines in detail the Roman antiquities of the county.

2. THE ICENI

On the threshold of this detailed survey, we are arrested by the name and story of the Celtic tribe which inhabited the district at the date of the Roman conquest. The boundaries of Norfolk, as we have said above, do not coincide with any Celtic boundaries known to us, but the county lies wholly inside the territory of one tribe, the Iceni, and the Iceni are so closely connected, both in fact and fiction, with the eastern counties that we cannot begin without some account of them.

The Iceni dwelt in Norfolk : probably they also held most of Suffolk and perhaps some part of Cambridgeshire. We seem first to hear of them in Cæsar’s ‘Gallic War’ under the name of Cenimagni.

¹ The rude ironworkings near Beeston (see Index) may be of Roman date, but are unimportant.

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Cæsar, in describing his second British campaign, mentions five tribes which 'surrendered,' the Cenimagni, Segontiaci, Ancalites, Bibroci and Cassi, and the context in which he mentions them makes it highly probable that their territories lay to the north of the Thames and to the north or west of what is now Essex. Beyond this nothing is recorded of these tribes; they may, indeed, have been petty peoples whose names looked well on paper, but whose real importance was trifling. Celtic philologists, however, think it possible that an original name Icenimagni (or Ecenimagni) might have been abbreviated by Cæsar into Cenimagni and by later generations into Icenî.¹ Our next traces of the tribe consist in certain British silver coins inscribed ECE or ECEN (fig. 2), which, along with other gold and silver coins of similar types, though different legends, have been found at several sites in

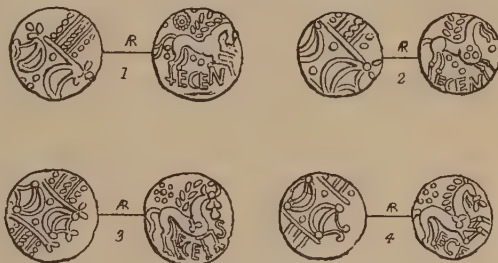


FIG. 2. COINS OF THE ICENÎ (ECENÎ).

Norfolk and Suffolk and probably date from the century which elapsed between Cæsar and the definite Claudian conquest (B.C. 55–A.D. 43). These coins plainly belonged to the currency of the Celtic tribe then dwelling in and round Norfolk, and the assumption is easy and natural that ECE and ECEN stand for Ecenî or Icenî.²

When the Roman conquest commenced, the Icenî became famous for a little while. At first, as Tacitus relates, they took the Roman side, and perhaps naturally. South-eastern Britain before A.D. 43 was in great part subject to the sons and heirs of the Catuvellaunian chief Cunobeline, but their rule was disputed and disliked, and to many Britons the Roman legions came as deliverers from despotism. The Icenî were neighbours of the Catuvellauni: if not their subjects, they may well have feared subjection. Certainly they joined the Romans and thereby retained some shadow of independence under the rule of their native princes. Four or five years later they repented them. Irritated, as it seems, by some general measure of disarmament enforced by the Romans, they headed a rising. Naturally, they failed; but they were allowed still to be ruled by their native princes. Twelve years later, they rose again. Their prince Prasutagus, dying, had bequeathed his private wealth to his two daughters and the Emperor Nero. Such was the fashion of the time—to satiate a greedy Emperor with a heavy legacy, lest he should confiscate the whole fortune. Prasutagus hoped thus to save his kingdom for his

¹ Cæsar, *De Bello Gallico*, 5. 21; Rhys, *Celtic Britain* (ed. 2) p. 287. The attempts to emend the name by conjecturing *Icenî Magni* (the Great Icenî) or *Icenî Cangi* or *Icenî Regni*, or the like, are all failures. Of the other tribes named, the Segontiaci have been connected with Silchester and the Bibroci with Berkshire. But the former of these identifications is very dubious (*Victoria County Hist. of Hampshire*, i. 273), and the latter, which rests only on the outward similarity of the names, is, according to Mr. W. H. Stevenson, philologically most improbable.

² Evans, *Ancient British Coins*, chaps. xv., xxviii. The forms Ecenî and Icenî seem philologically interchangeable.

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Norfolk, to pause and consider the true history of the name Icknield Street. The result enables us to put the Icenî aside and pass on, free of theories, to the details of Romano-British Norfolk.

3. PLACES OF SETTLED OCCUPATION, TOWNS, ETC.

Norfolk, so far as it is at present known to us, contains no site which can with entire certainty be described as the site of a Romano-British town: it has no Silchester or Canterbury, revealing its character beyond question by its remains. But one spot, though unexplored and most imperfectly known to us, may perhaps be accepted as the site of a little town. This is Caister St. Edmund's, or, as it is generally styled, Caister-by-Norwich, about three miles south of Norwich itself.

(a) CAISTER-BY-NORWICH

Caister has generally been identified with *Venta Icenorum*, a place mentioned in the *Itinerary*, and also by Ptolemy and the *Ravenna Geographer*, though the name has been misspelt in their manuscripts. The scholars of the sixteenth century hesitated somewhat about the point, as when one writer explained Norwich to be the city of the *Nordovices* or *Ordovices*—a tribe really settled in Wales—and another placed the *Brigantes* in Norfolk instead of Yorkshire, and a little later Spelman identified *Venta* and *Brancaster*. But these fancies of early topographers were soon cast aside, and there has been practical agreement amongst antiquaries ever since. The evidence, though only circumstantial, is indeed too strong to permit of much real doubt. Tacitus, Ptolemy and coins tell us enough to show that the Icenî inhabited Norfolk. Ptolemy names *Venta Icenorum* as the one noteworthy town of the Icenî, and the *Itinerary* places it at the end of a route which runs from London through Essex to Colchester and for some distance further, though it cannot all be traced with any certainty. Finds of British coins indicate further, as Sir John Evans has pointed out, that we may expect to find the chief town of the Icenî somewhere in the vicinity of Norwich.¹ Now, if we exclude two sites which are unquestionably military, *Brancaster* and *Burgh Castle*, *Caister-by-Norwich* remains the one spot within the probable limits of Icenian territory which agrees with our evidence. It alone can boast of Roman walls and an abundance of smaller remains, such as suit a town of some note, a tribal centre so long as the tribe lasted, and the end-station of a route: it alone can be brought into harmony with the indications of the *Itinerary*. Norwich antiquaries have sometimes set up the claims of Norwich itself as *Venta Icenorum* in preference to *Caister-by-Norwich*. But the Roman remains hitherto discovered in Norwich, even if those found in the suburbs be included, do not amount to much more than a few pieces of pottery and a few coins. They are wholly inadequate to prove the presence of a town such as we should expect *Venta Icenorum* to have been. Nor can any stress be laid on the fact that an eleventh century chronicler, William of Poitiers, once

¹ The precise localities where these coins have been found seem not to have been recorded. But many come from 'near Norwich,' hardly any from Norwich itself.

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calls Norwich Guenta. Probably he confused it in some way with Winchester, which learned men of his time called Venta or Guenta: in any case an isolated passage is of little moment.¹ We may then conclude, so far as our present knowledge reaches, that Caister-by-Norwich was Venta Icenorum. But, in accepting this conclusion, we must reject one argument often advanced in support of it. The little stream which flows by Caister, sometimes called the Wensum, has been thought to aid by its name the identification of Venta and Caister. Philologists, however, agree that this aid must be renounced, and it is not clear whether the stream, now usually called the Tas, has any real right to the name Wensum.

The meaning of the name Venta is, unfortunately, uncertain. It occurs twice elsewhere in Celtic lands, and both cases are in Britain: Venta Belgarum (Winchester) and Venta Silurum (Caerwent in Mon-

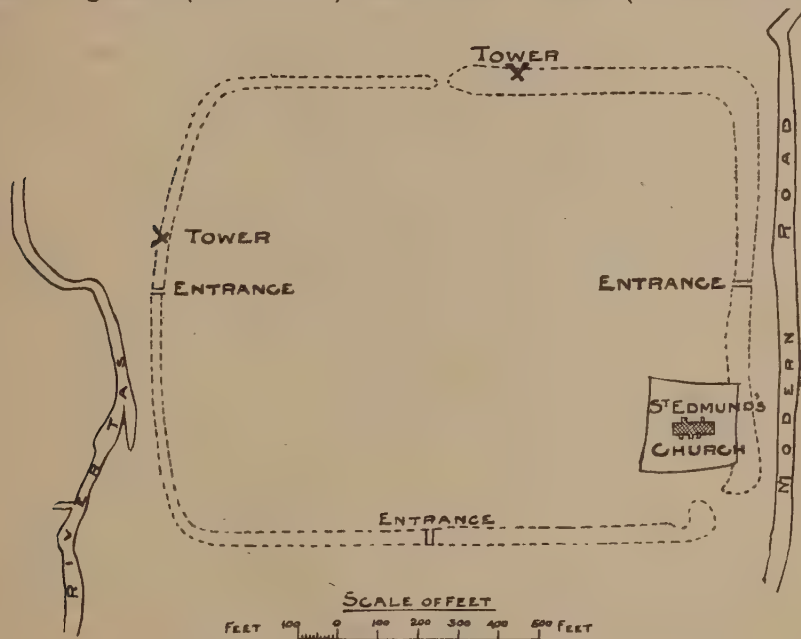


FIG. 3. OUTLINE OF CAISTER-BY-NORWICH.

mouthshire). It has been freely and frequently explained as the Latin form of a supposed Celtic word 'Gwent,' meaning a champaign or open district; but this explanation is rejected by the best Celtic philologists, and it will be wise to defer to their opinion. What the name does mean, must remain for the present undecided.

The place itself, as the visitor sees it to-day, is a flat and almost empty enclosure, situated in the valley of the Tas or Wensum, on the

¹ Hudson Gurney, *Letter to Dawson Turner with the Proofs that Norwich was the Venta Icenorum* (privately issued, 1847). William of Poitiers, 148 (Duchesne's *Hist. Northmann. Script.*, p. 208; Migne, *Bibl. Lat.*, cxlix. 1,263C): the passage is repeated almost verbally by Ordericus. Freeman, in his *Norman Conquest* (iv. 67 note) seems to think that William knew Venta Icenorum to be the old name of Caister and used it of Norwich as being close by. I cannot see how William could have had such knowledge: no one else shows any trace of having known it for five hundred years before or after William. On the other hand, Venta for Winchester was familiar enough in his day.

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east bank of that little stream and close to the water's edge. In shape it is roughly rectangular, longer from east to west than from north to south: its western side curves slightly outwards to the river (fig. 3). Round the enclosure stand, on the north and west, the striking ruins of ancient and massive walls (fig. 4), and on the east and south huge earthen mounds concealing walls beneath them, while outside, except along the river face, a great fosse or ditch can still be traced. The size of the place has been variously estimated, and indeed the earthen mounds hinder exact calculations, but the true internal measurements probably approximate to 1,400 feet from east to west and 1,100 from north to south, and the internal area seems to be about 34 acres.¹ Four entrances can be observed, one in each side, but their antiquity needs to be confirmed by excavation. The walls consist of a concrete core, bonding-tiles and a flint facing, and in general resemble most of the Roman walls of towns and forts which still exist in our southern and south-eastern counties. They were strengthened externally by round projecting towers, such as were often used in the fourth century. One of these towers can still be traced close to the entrance on the west or river face: another, on the north face, was seen by Mr. Arderon, but is no longer visible above the surface. Both towers are said by the writer just named to have been constructed, like the walls, of concrete and bonding-tiles but to have been faced with bricks cut in squares instead of flints.² In addition to the external towers, the walls appear to have had a ramp of earth behind them, but the exact relation between wall and ramp is not clear. Thus, it has been suggested that Caister was originally defended only by earthen ramparts and that walls were subsequently added in such a way that the outer face of the defences was new perpendicular masonry and the inner face the earlier earthen rampart. It may, perhaps, be simpler to suppose, in default of excavation, that here, as elsewhere, the ramp was erected for the sake of the wall.³

The enclosure of 34 acres within these walls is now one wide enclosure of agricultural land, save that a mediæval church stands near one corner, as at Porchester and Silchester. No recorded excavations have ever been made here, and we are totally ignorant as to the buildings which presumably covered the ground in Roman times. We may be sure that the church does not represent a Romano-British *sacellum*, as some rash writers have supposed, but we have no definite feature

¹ So the Ordnance Surveys and Wilkins in *Archæologia*, xii. 137. William Arderon, in *Philosophical Transactions*, xlvi. (No. 493) p. 200, gives the internal measurement as 1,176 by 792 feet, the internal area as 21 acres, and the total area including mounds and fosse as 32½ acres. Edward King (*Munimenta Antiqua*, ii. 49) and Gough (*Additions to Camden*) follow him, but he is certainly wrong. I incline to think that he had figures for the internal area and for the space occupied by the mounds and fosse, and that he then, by some confusion, treated the internal area as if it included the mounds and fosse, and subtracted the figures for these latter when he should have added; but the matter is not very clear nor, fortunately, very important.

² Mr. Fitch (see next note) says the facing is flint. He adds that the circumference of the western tower was originally 31 feet.

³ For descriptions of the site and walls, see W. Arderon (cited in the last note); Gough's *Add. to Camden*, ii. 188; Wilkins, *Archæologia*, xii. 137; *Gentleman's Magazine* (1807), ii. 913; Edward King, *Munimenta Antiqua*, ii. 49; R. Fitch, *Journal of the British Archæological Association*, xiv. 124. The annexed plan is adapted from the Ordnance Survey.



FIG 4. WALL OF CAISTER-BY-NORWICH.

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to substitute for the wrongly imagined shrine. Only the broken tiles and bricks and pottery which are scattered over the whole area—most abundantly, perhaps, in its western portion—testify to definite Romano-British habitation of some kind.

Two structures have, however, been discovered in the immediate neighbourhood. In 1846 Sir John Boileau excavated the foundations of a small rectangular building, distant two or three hundred yards from the north-east corner of the ramparts (fig. 5). It was found to be a plain rectangular structure, measuring internally 24 by 30 feet: its walls were of flint, faced on both sides with flint, and pierced with three apertures placed symmetrically in each of the longer sides. Wall plaster,

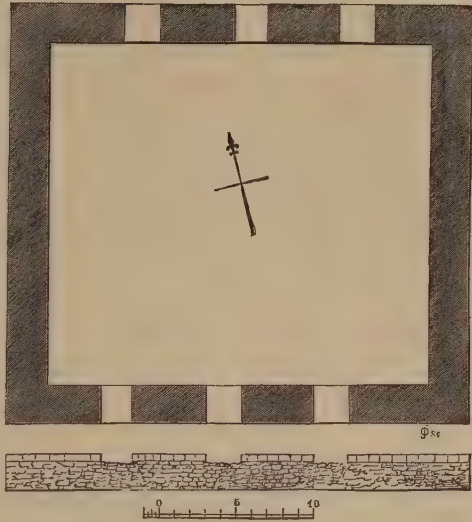


FIG 5. BUILDING OUTSIDE THE WALLS OF CAISTER.



FIG 6. TERRA-COTTA FRAGMENT.

flooring 'tesserae' of brick, fragments of Samian and other earthenware, bones of men and animals, tiles, one or two coins and a rude silver ring, were discovered in or near the building. Signs of an ancient road were noticed close by, and in 1849 a terra-cotta head of Diana (?) was found near at hand (fig. 6). The building seems to have been wholly isolated from any other structure; its excavators suggested that it may perhaps have been a tomb. The other structure found outside the ramparts is a kiln, detected in 1822 on a hill about a quarter of a mile to the north-west, on the west side of the river. When found, it is said to have contained urns of undoubtedly Roman character, just as they were actually placed for burning (fig. 7). Other urns were noticed near, but it seems uncertain whether they were Roman.¹

Numerous finds of small objects have been made in and near the

¹ For the rectangular structure see *Archæological Journal*, iv. 72 (with plan): the objects found in and near it, mostly in possession of Sir F. Boileau, are enumerated by Mr. Fox, *Archæological Journal*, xlv. 356. For the kiln see Layton in *Archæologia*, xxii. 412 (with illustrations); *Norfolk Archæology*, vi. 155; Dawson Turner's Papers, British Museum Addl. MS. 23027, p. 91. The sites are marked in the larger Ordnance Maps—whether correctly, I do not know. For the terra-cotta head see *Archæological Journal*, vi. 180 (if the same object), x. 274; *Norfolk Archæology*, iv. 232; both with plates: it is now in Norwich Museum.

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place. Bronze ornaments are not uncommon, as, for instance, a bronze lamp in the form of a well designed satyr and another in the form of a sandal, both found in the eighteenth century ; a small bronze head, conjectured to be Geta, found near the



FIG. 8. SMALL BRONZE BUST.

rectory (fig. 8) ; a little bronze figure of Bacchus (?), a tiny bronze axe (fig. 9), some curious *fibulæ* (fig. 9), a mirror (fig. 10), and part of a pair of scales. A fine gold ring, set with an onyx stone bearing an intaglio of the Genius of Victory, also deserves notice. Pottery, including Samian,

abounds ; I may mention a broken Samian bowl inscribed PRISCINI...

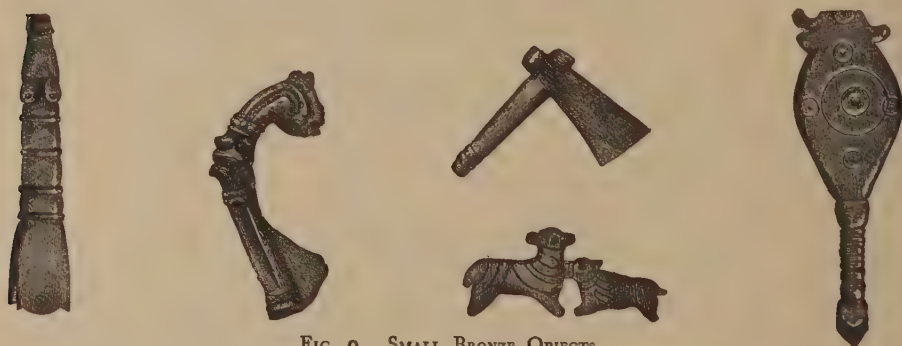


FIG. 9. SMALL BRONZE OBJECTS.

which was found in 1897 inside the enclosure. silver one of Augustus and a gold one of Nero (fig. 11), but they commence otherwise with silver and bronze of Vespasian and extend to Gratian, thus covering the whole period of the Roman occupation except its first and last thirty or forty years. An urn with twenty silver coins including a rare one of Otho, a small hoard was found, about 1895 outside the walls near Caister Hall.¹ Let me conclude with a curious gold coin found in 1857 on Chapel

The earliest coins are a



FIG. 11. GOLD COIN OF NERO.

¹ For the bronze objects see *Norfolk Archaeology*, iv. 232 ; v. 200, 271 ; vii. 373 ; ix. 363 (of doubtful date) ; *Archæological Journal*, x. 373 ; xiv. 176, 288 ; Dawson Turner MS. 23,027, p. 93. Many of the objects are now in the Fitch room of the Norwich Museum, but doubts might possibly be felt as to the genuineness of one or two. The gold ring is mentioned in the Norwich volume of the *Archæological Institute*, p. xxix. For the pottery see *Norfolk Archaeology*, v. 200. Much of the so-called Roman pottery found outside Caister, especially that found in the Chapel Hill cemetery, Markshall, appears to be Anglian (Norwich Museum ; Dawson Turner MS. 23,055, p. 111, and 23,035, p. 127 ; *Archæologia*, xviii. 436). The Ordnance Survey marks, however, a Roman coin and stone cist as found there in 1845. I am indebted for the Samian potter's mark cited to the Rev. C. R. Manning. For the coins see *Norfolk Archaeology*, iv. 233, v. 203 ; *Archæologia*, xii. 138. For the hoard *Norfolk Archaeology*, xii. 340 : Mrs. Green of Caister Hall has kindly allowed me to see it ; it extends from Tiberius to Faustina junior, and was buried soon after A.D. 180. Blomefield's account of the coins (v. 423) is not very helpful. A terra-cotta lamp from one or the other Caister is noted in the *Journal of the British Archæological Association*, x. 106.

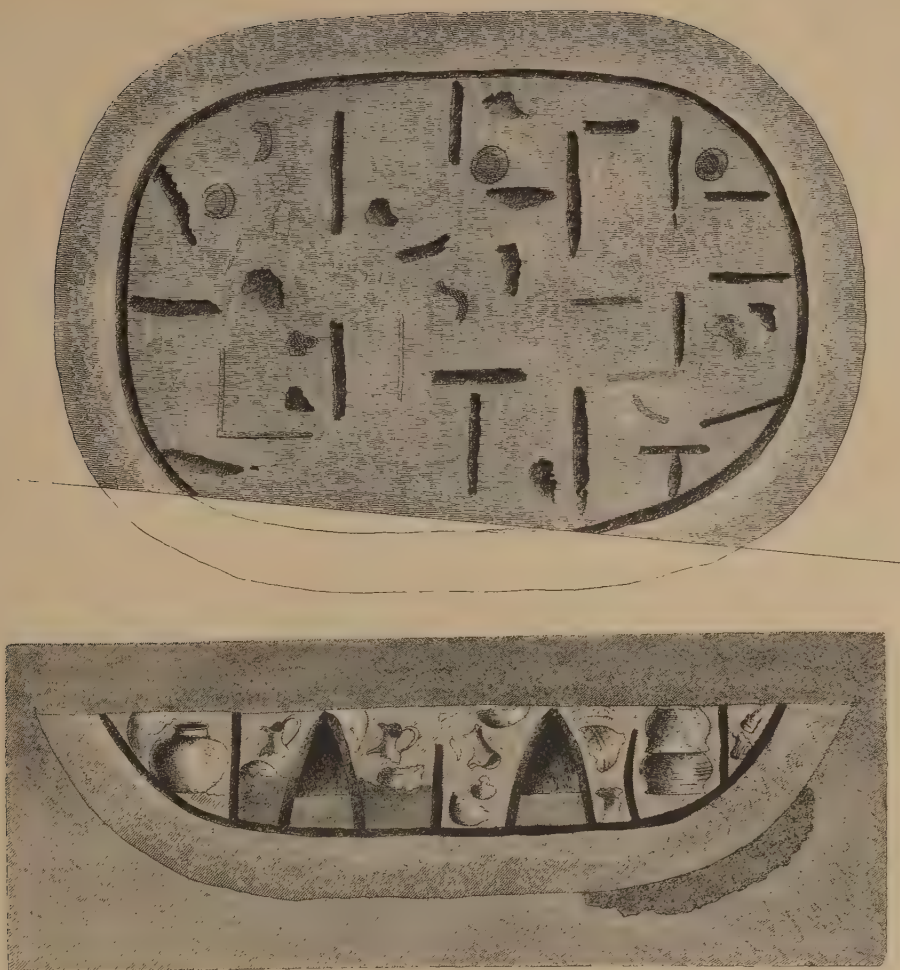


FIG 7. PLAN AND SECTION OF KILN NEAR CAISTER.



FIG. 10. BRONZE MIRROR.

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Hill, in Markshall, 1,200 yards north of the place, and across the river. It is a rude imitation of a 'Third Brass' of Helena, and good judges have assigned it to the period between the end of Roman rule and the English conquest.¹

It remains to consider the character of the place. I have classed it as a small country town, and other writers have done so before me. But it is proper to add that others again have considered it a great military fortress. Thus, one archæologist quotes the remark of Tacitus that after the defeat of Boudicca the auxiliary troops were planted in fresh posts, and thinks Caister to be one of these. Another ascribes Caister to an early period in the Roman conquest, and suggests that hence the Romans pushed westwards: he traces their progress by the earthworks at Ovington, Mileham and Castleacre. I do not think that either of these writers proves his case. The area of Caister, while somewhat small for a legionary fortress, is a very great deal too large for an auxiliary garrison;² while its connection with the earthworks at Ovington, Mileham and Castleacre must be held a hazardous theory in face of the fact that hardly any Roman remains, and none of early date, have been noticed at any of the three spots. In truth there is no good reason to call Caister a Roman place of arms. No military remains have ever been found there. Its modern name, though derived through Anglo-Saxon from the Latin *castra*, does not prove it to have been a fortress, while its Romano-British name indicates rather that it was a small country town, like Venta Belgarum or Venta Silurum, and its area and remains harmonize with such a view. The evidence of coins further suggests that its Roman life commenced during the last twenty or thirty years of the first century, while the round towers of its walls show that it was fortified at the end of the third century or during the fourth, like many other country towns in Britain and northern Gaul. Further than this we cannot go. The site, though open and available for excavations, has never been trenched, and till the spade come to our help, we must remain content with this vague sketch of what is, at least, probable about a striking ruin.

(b) CAISTER-BY-YARMOUTH

Another Norfolk site, also called Caister, may perhaps be that of a little settlement or at least a village. Caister-by-Yarmouth stands on rising ground half a mile from the shore, about two miles north from Yarmouth town. It has usually been described as a fortress guarding the arm of the sea which may once perhaps have flowed over the flats between it and Yarmouth. No trace of a fortress has however been discovered, nor any sign of walls or fortifications of any sort. The remains actually found are principally as follows: (1) In 1837 some labourers digging clay in a field near the Norwich road, 'a few hundred yards' to the north-west of Caister church, met with a pit at least 6 feet deep and

¹ *Numismatic Chronicle*, xx. 43, and *Proceedings*, Nov. 19, 1857.

² The known legionary fortresses seem to average 45-55 acres; the smaller forts, which were garrisoned by auxiliaries, vary from about 4-9 acres.

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7 by 11 feet in extent, walled with flanged tiles for part of its height, and containing bones of oxen, pigs and other animals, oyster-shells and potsherds of Roman date. Skeletons, coins (mostly A.D. 270-320), tiles and pottery were noticed at the same time in other parts of the field, and a subsequent writer states vaguely that foundations of buildings exist here. (2) In 1843 a claypit north-east of the church yielded a burial urn full of bones and ashes, covered by a tile, and also remains of an inhumation in a wooden coffin. (3) In 1851 a kiln containing broken pottery and a curious iron drying-stand was dug out of a sandpit on the south side of the church, between it and the marshes. (4) In 1855, during the construction of the reservoir, much broken pottery (including Samian), a little bronze bust (? a Faun), a bronze pin, many 'Third Brass' coins, bones and oyster-shells were found—apparently the filling of a rubbish-pit. (5) In 1879 a rude flint pavement or foundation was exposed in the rectory garden, and some coins, pottery and an ashpit discovered. Besides these definitely recorded finds, coins, potsherds and occasionally other objects—such as a little bronze figure of a wolf or dog, formerly the top of a staff or the like—have been recorded without detail of place or circumstance, ever since the days of Sir Thomas Browne. The earliest coins date from about A.D. 80, but those of A.D. 250-380 are the commonest.¹

These remains, like the remains of Caister-by-Norwich, do not indicate military occupation, and in the entire absence of military indications, it will be safer to hold Caister-by-Yarmouth to have been a small settlement of some sort, not adequately known as yet. Its situation may seem exposed to any chance sea rover, but girt as it is with marsh on south and east, it is less exposed than might at first sight be thought, and not more exposed than other Roman remains of a non-military kind on some of our coasts. Excavation or chance discovery can alone, however, decide beyond controversy: it is enough here to state the probabilities.

4. THE VILLAS

We have seen that Roman Norfolk is poor in towns. It is hardly richer in villas. No county in the south-east of England possesses, in proportion to its area, so few remains that indicate the residences of land-owners or the scattered structures connected with their estates. Nor are the remains merely few in number: they are also plain in character, and the list which I am about to give contains not even one instance of that common luxury, a mosaic pavement. This poverty is characteristic. We must indeed allow something in our estimate for evidence that has perished and evidence that has not been yet unearthed. The rural

¹ For (1) see *Gentleman's Magazine*, 1837, ii. 518; for (2) *Archæological Journal*, iii. 251 and Dawson Turner MS. 23,027, p. 132; for (3) *Norfolk Archæology*, iv. 352, *Journal of the British Archæological Association*, xxxvi. 90, 206; for (4) *Norfolk Archæology*, vii. 12; for (5) *ibid.* ix. 361 and *Journal of the B. A. A.*, xxxvii. 89; for the bronze wolf (?) *Norfolk Archæology*, vii. 356. It and other objects from the site are in the Fitch room of the Norwich Museum. See also Browne's *Urnbury*, chaps. ii., iii., and the Winchester volume of the *Archæological Institute*, p. xl. (Samian and other pottery).

Remains of Roman
at Ashill

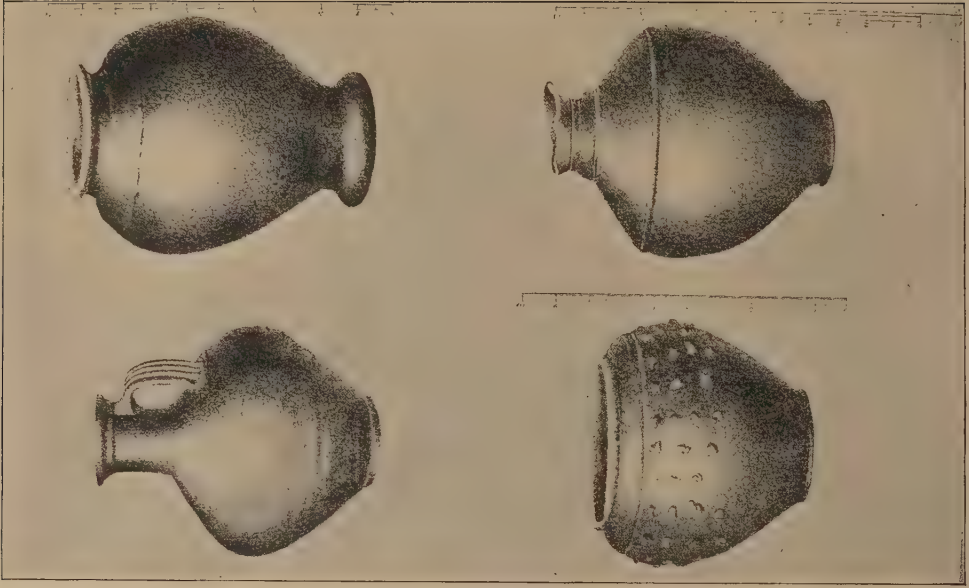
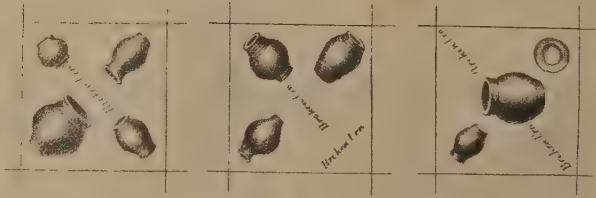
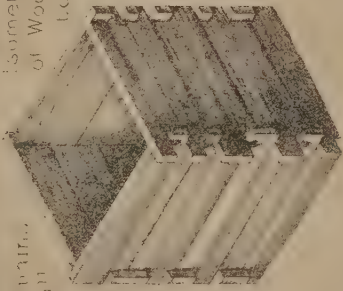


FIG. 13. ROMAN WELL AND URNS FOUND IN IT, ASHILL.

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dwelling-houses of a stoneless land like Norfolk may often have been slight and unsubstantial, and their remains would be easily destroyed or easily overlooked in aftertime. The plough, well used in Norfolk, has doubtless obliterated much, and more may still await the gentler mission of the spade. But for this we need hardly make greater allowance than in many other counties, and while we admit that our knowledge is imperfect, we must also admit that the development of Romano-British life in this corner of Britain was itself imperfect.

1. In the parish of Ashill, at a spot called Robin Hood's Garden, two miles west of the Peddar's Way and now intersected by the Watton and Swaffham railway (fig. 12). Here is, or was, a square enclosure of 10 acres surrounded by a ditch 7 feet deep and 14 feet broad, and, inside, another somewhat small enclosure, surrounded by a somewhat smaller ditch. Between the two ditches, at the point A in the annexed plan, were once foundations of buildings, removed (it is said) when the land was long ago brought under cultivation. Nothing is recorded about either the ditches or the foundations which would prove their date, but a striking discovery made in 1874 seems to justify us in assigning them to the Roman period. We may conclude provisionally that the foundations at A represent the 'villa'; the two ditches formed special enclosures round it, such as are by no means uncommon round Roman 'villas.'

The discovery of 1874 is however noteworthy for another reason than because it helps us to this conclusion; it is indeed a very curious and puzzling discovery. During the construction of the railway the workmen found a wooden construction which on investigation proved to be a well or shaft, put together like an 'Oxford' frame, and measuring $3\frac{1}{2}$ feet square and 40 feet deep (fig. 13). The woodwork commenced at 6 feet below the present surface, and traces of paths leading to it were noticed. The contents of the shaft were very remarkable. For its upper 19 feet they consisted of Samian and other potsherds, painted wall plaster, bones of animals including a frog or toad, the staves of a wooden bucket, bits of a wickerwork basket, an iron knife, four shoes, and so forth, all lying promiscuously in the earth—in short, just what one would expect in a rubbish-pit. But below this, we are told, the deposits changed: they now (19–34 feet vertical measure) consisted of fairly perfect urns (fig. 13),

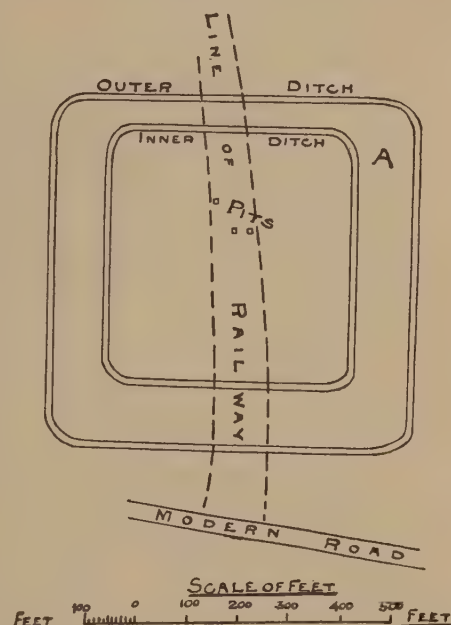


FIG. 12. PLAN OF ENCLOSURES NEAR ASHILL.

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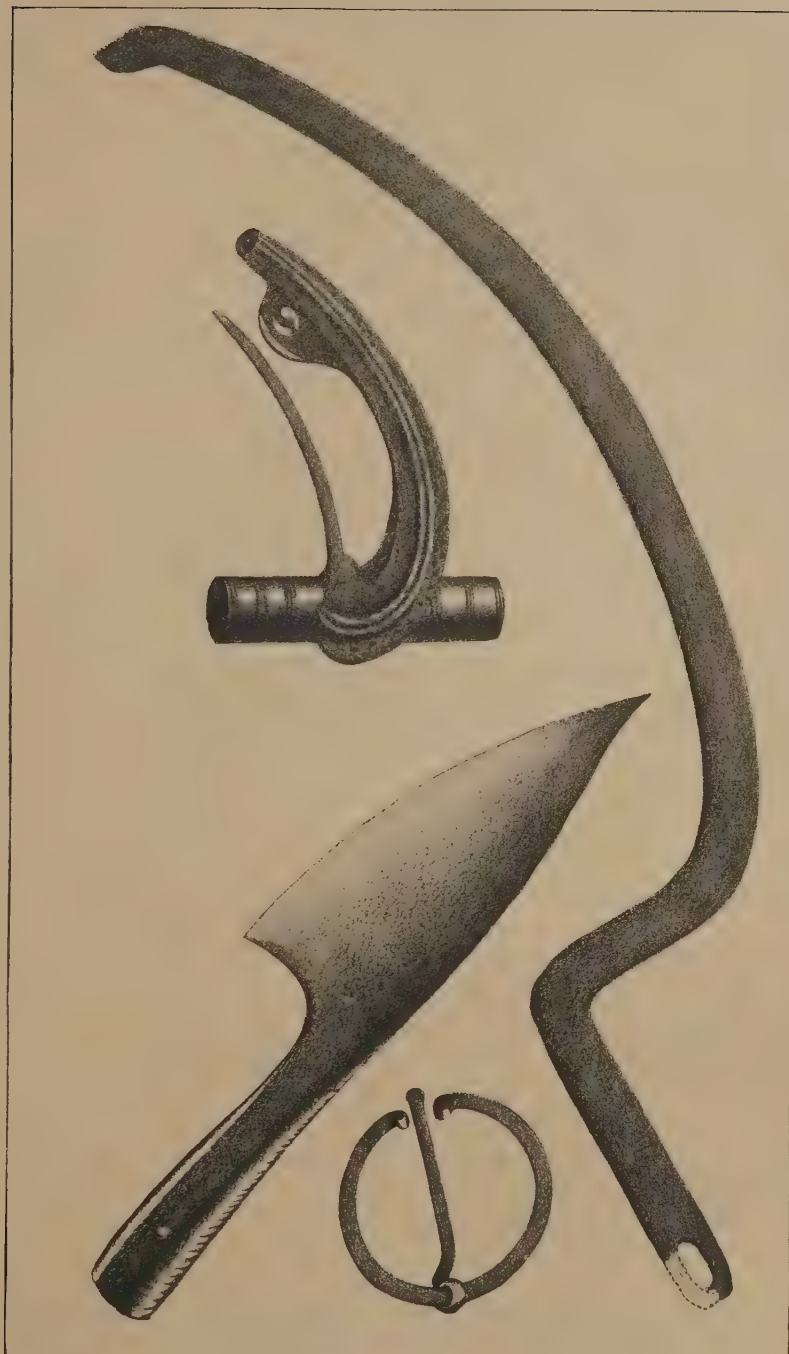
placed as if symmetrically in layers and embedded in leaves of hazel and nut, and the excavators stated that the hazel-nuts in the upper layers were more mature than those lower down, that is, the layers were deposited gradually and not all at once. Some objects were found among the urns—fibulæ, one or two iron utensils (fig. 14), bones and the like—but fewer (apparently) than in the upper half of the shaft. The bottom was paved coarsely with flints. Two other pits were found close by. One was a mere refuse-hole 5 feet deep. The other, 22 feet deep, resembled the principal pit, but appeared to have bulged in and been abandoned almost as soon as made.¹

Pits containing symmetrically arranged urns have been recorded from some other parts of England. At Bekesbourn Hill, near Canterbury, a wooden shaft very like the Ashill shaft was found in the making of the London, Chatham and Dover railway: its upper part was full of large flints, its lower part contained urns placed carefully between layers of flints. At Lothbury, in London, a boarded pit was found carefully planked over at top and filled in its upper part with gravel; below, symmetrically arranged urns were found in layers, a coin of Allectus and some iron implements resembling a boathook and a bucket-handle. At Silchester, near Reading, a pit excavated in 1894 in *Insula* xii. yielded a dozen perfect urns, deposited in three layers with patches of moss between them, and some animal's bones; and a small boarded well, excavated in 1899 in *Insula* xxi. was found to be full of gravel and to have four perfect urns at the bottom. Other instances are known of boarded wells or pits containing much pottery, but without the same symmetrical arrangement—as at Felixstowe in Suffolk and Ewell in Surrey, and Biddenham and Dunstable in Bedfordshire; while at Stone, near Aylesbury, a pit or well has apparently been purposely used as a rude *columbarium*. The explanation of these pits, and in particular of those which seem to exhibit purposeful and symmetrical arrangement in layers, has been disputed. They have been called sepulchral, but, except at Stone, hardly any trace of human bones or ashes or burial has ever been noted in them. They have been called surveyors' marks, but they are odd landmarks and the whole theory of Roman surveying with which they have been connected is probably unsound. They have been called storehouses, but the lower part of a wooden shaft, 30 or 40 feet deep, is a curious cellar. They seem in general to be disused wells, and the question has been asked whether the symmetry of urns and layers may not after all be due to an over ingenious interpretation by the modern excavator rather than to some custom of the Roman-Briton. If the symmetry is real, it is a problem rather for the anthropologist than the antiquary or historian.²

¹ For the Ashill villa see *Norfolk Archaeology*, viii. 224; *Archæological Journal*, xxxii. 108; *Journal of the British Arch. Association*, xxxi. 469; C. Roach Smith, *Collectanea Antiqua*, vii. 110. Some of the urns are in the Norwich Museum. The site is marked on the Ordnance maps. Roman remains have been found close by, at Saham Tony (see Index).

² For Bekesbourn see *Archæologia Cantiana*, ii. 46; Lothbury, *Archæologia*, xxvii.; Silchester, *ibid.* liv. 458, lvii.; Felixstowe, *Archæological Journal*, xxxi. 303, lvii. 102; Ewell, *Archæologia*, xxxii. 451; Bedfordshire, *Associated Architect. Societies Reports*, iv. (1857), v. (1859); Stone, *Archæologia*, xxxiv. 21. Gen. Pitt-Rivers has some general remarks, *ibid.* xlvi. 446–450.

FIG. 14. IRON KNIFE, IRON OBJECT OF UNCERTAIN USE, AND TWO FIBULE FROM ROMAN WELL, ASHILL.



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2. At Baconsthorpe. Here Mr. F. G. Spurrell has noticed 'bricks, sherds, querns, etc.,' at and near the ruined Hall and in Baconsthorpe generally, and the bricks, if Roman, may indicate a house. No other writer, however, mentions such remains.¹ For the large hoard found near this village in 1878 see the seventh section of this article.

3. Near Brundall railway station, on the rising ground to the north-west. Here discoveries made in 1882-87 indicate a dwelling and perhaps local manufacture of common pottery. Half a mile west of the station, at a level of 20 feet above the marshes of the Yare, in Dr. Beverley's grounds, a curious depression was found, 100 feet long and 5 feet deep, filled with irregular lumps of clay mixed with charcoal; some carbonized oak, iron nails, an iron knife and an iron blade were detected also among the clay lumps, and two drains made of roof-tiles were traced running down the slope to the depression. Higher up and 200 yards to the west, a heap of unburnt clay bricks and some potsherds were unearthed, while close by flue and building-tiles, foundations of brick and concrete rubble, a roof-tile with a nail in it, and fragments of Samian and other pottery occurred. Long ago, in 1820, some burial urns were found in the same locality, in the Upper and Lower Chapel-field, but it is not certain if they were of Roman date.²

4. Dunham. Fragments of Roman brick have been seen in the church tower by Mr. G. E. Fox, and pieces of Roman pottery and coins are said to have been found in the parish of Great Dunham. A circular enamelled brooch has been found at Little Dunham hard by.³

5. Fring, at a spot on the west side of Peddar's Way. Here, in the last decade of the eighteenth century 'some labourers in ditching broke up the remains of a pavement apparently Roman, which the country people broke up and carried away great part of. The owner of the ground ordered the spot to be carefully covered up for the future inspection of antiquaries.' Unfortunately no antiquaries have yet availed themselves of the owner's wisdom.⁴

6. Howe. Here Mr. Fox mentions undoubted Roman brick and tile in the masonry of the church, and a gold coin of Nero has been found in the parish.⁵ The bricks and tile might possibly have come from Caister-by-Norwich, which is not quite 4 miles to the north-west.

7. Methwold, about three-quarters of a mile north of the village and a quarter of a mile west of the third milestone from Stoke Ferry on the Stoke and Brandon road, at 'Little Holme,' between the convergence of the String Drain and Hoggard's Dyke. Here part of a dwelling-house has been actually excavated—three small rooms, each about 8 feet

¹ *Archæological Journal*, xxxi. 434.

² G. E. Fox, *Archæological Journal*, xli. 354, 355; H. Daveney, *East Anglian Notes and Queries*, i. (1860) 134. I understand that nothing definite has been found since 1887, but that bricks, tiles and pottery are constantly turned up in digging.

³ G. E. Fox, *Archæological Journal*, xli. 359; *Norfolk Archæology*, i. 360. The *fibula* is figured by Dawson Turner (MS. 23,029, p. 81) and in the Norwich volume of the Institute, xxvii. xlii.

⁴ Gough's *Add. to Camden*, ii. 201; *Archæologia*, xxiii. 370.

⁵ *Archæological Journal*, x. 62; G. E. Fox, *ibid.* xli. 335, 362.

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square, one warmed by a hypocaust, one floored with cement, the third probably floored with tile, and all three walled in flint rubble and Northampton sandstone; roof-tiles and potsherds were also found. The site is only 4 feet or so above fen-level.¹

8. Reedham, on the low hill north of the river Yare. Here, early in the nineteenth century a Mr. Leighton discovered, a little east of 'Low Street,' Roman coins, pottery, a bronze lion's head and some foundations which were taken to be those of a circular Roman tower. Earthworks are said also to have been visible, and Mr. Fox testifies to much Roman material in the walls of the church. The coins found at Reedham at various times range mostly from about A.D. 70-170, but also include Gordian (A.D. 238).² These remains have frequently been explained as those of a fortress connected with the fortress at Burgh Castle, and the round tower has been called a Pharos. They do not however include any items indicative either of military occupation or of the fourth century, the period of Burgh Castle; and though too little has been recorded to allow of a definitive explanation, it will be better to class them provisionally with other rural buildings.

A few other sites have been credited with remains which may indicate villas or other buildings, but so far as I can judge, the existing evidence is in every case inadequate. Such as it is, it will be found in the Index to this chapter under the names Bickerstone, Coltishall, Framingham, Melton Magna and Narford. On the other hand I incline to suspect that the remains found on the borders of the three contiguous parishes of Brampton, Buxton and Oxnead may denote some undiscovered dwelling or village. The same may be true of Threxton, Felmingham, Thorpe and Brettenham. But with all allowances our list cannot be extended far. We must admit that the villa-system which characterizes most of Roman-British rural life, was but scantily developed in Norfolk. To put it concretely, we must conclude that during Roman days the district had few resident landowners or local magnates or large farmers. Perhaps we may be tempted to conclude that the lower rural population of labourers and shepherds and hunters and fishermen was also sparse or at least unevenly distributed, and our evidence is on the whole consistent with such a surmise. But we have not, and perhaps we are never likely to have, enough information about Roman Norfolk to attempt an estimate of the density of population, and we can do no more than conjecture that the



FIG. 15. KEY: THREXTON
(see Index).

land was thinly inhabited. Our next section may confirm us in this view.

¹ *Journal of the British Archaeological Association*, xxxviii. 110; *Norfolk Archaeology*, ix. 366.

² *Archæologia*, xxiii. 364; *Norfolk Archaeology*, iv. 315; *Archæological Journal*, lvii. 127. See further, p. 305.

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5. ROADS

In a district such as we have hitherto described, where towns were few and small and country houses rare, we should expect roads also to be infrequent. And as a fact we find but few Roman roads within the bounds of Norfolk. Our antiquaries have not always accepted this view. Like Mr. Samuel Woodward in the map which he drew up some seventy years ago, they have preferred to cover the county with a network of what they hold to be proved or probable Roman ways, and they have not been afraid to add imaginary British tracks. But an examination of the actual evidence yields a different and perhaps more credible picture.

Our evidence for determining Roman roads is of two kinds, written and archæological. The archæological evidence is that presented by remains on the ground. We may for instance find ancient metalling along a line where a Roman road might reasonably be expected. Or we may find a still existing track which runs with persistent straightness from one Roman site towards another. The written evidence is more elaborate. Charters tell us of streets bounding estates to which the documents refer. Place-names like Stratton and Stratford, if of established antiquity, suggest ancient and often Roman ways.¹ Parish or county boundaries sometimes preserve curious information. But our chief written evidence is that of the *Itinerarium Antonini*, a Roman road-book, which gives the distances and stations along various routes in the Roman Empire. Its exact age and object are disputed and do not now concern us. Its accuracy, which matters more, is by no means complete, and in general it is perhaps more useful as testifying that a road ran in a particular direction, as for instance from London to Norfolk or to Lincoln, than in telling us the precise distances from 'station' to 'station.' For our present purpose, the following routes are material. We give the distances as given in the Itinerary, in Roman miles, 13 of which may be reckoned as equivalent to 12 English miles.

1. Route from Venta Icenorum to London : Venta to Sitomagus, 32 miles ; Sitomagus to Combretonium, 22 miles ; Combretonium to Ad Ansam, 15 miles ; Ad Ansam to Camulodunum (Colchester), 6 miles ; and so on.

2. Part of route from London to Carlisle by Colchester, Chester-ton near Peterborough and Lincoln : Colchester (Colonia) to Villa Faustini, 35 miles ; Villa Faustini to 'Icinos,' 18 miles ; to Camboritum, 35 miles ; and so on.

Combining these evidences, let us attempt to sketch the Roman roads of Norfolk. They are in so far easy to describe, in that they belong to one road system, that which served the eastern counties, but our views about them must in part depend on our views of certain Roman roads in Suffolk and adjoining counties, and we cannot limit ourselves absolutely to the bounds of Norfolk.

¹ The name 'Portway' should not be included among names indicative of Roman roads. It means simply 'road to the town,' and was frequently applied to roads which there is not the least reason to call Roman.

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1. Direct road from Colchester to Caister-by-Norwich. This road appears to have coincided largely with the existing high road from Colchester to Norwich. The straightness of that road from Earl Stonham northwards, its frequent use as a parish boundary, the Roman remains found along its course, and the occurrence of names like Stratford St. Mary (on the Stour) and Long Stratton, indicate a Roman road along this line. It enters Norfolk at Scole on the Waveney, where some Roman remains have been discovered and some stonework has been noted in the river which may possibly represent a paved ford. Thence it proceeds through a district empty of Roman traces, often serving as a parish



FIG. 16.

boundary, past Long Stratton to the vicinity of Caister. The length of the road from Colchester to Caister is about 50 English miles, and it may conceivably represent, therefore, the second of the two Itinerary routes just mentioned. By that route Colchester is 53 miles from 'Icinos,' and Icinos, as we have before said (p. 286), may be an accusative plural of which the nominative Icini, that is Iceni, might be an abbreviation of Venta Icenorum.¹ However the continuation of the route through

¹ So Kiepert in his *Formæ Urbis Antiquæ* (Berlin, 1894). In general his delineation of Roman roads in Britain is very unsatisfactory in that work, but this view deserves attention.

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Camboritum to Lincoln involves on this hypothesis serious difficulties into which we cannot now enter. It is sufficient to know that there is good evidence for a Roman road from Colchester by Stratford and Scole and Stratton to Caister.

2. Longer road from Colchester to Caister. The first of the two Itinerary routes which I have quoted, gives a route from Caister to Colchester, which is 76 Roman miles long, and is therefore obviously not direct. There are traces of such a route, and indeed more traces than are needful (fig. 16). These traces indicate a road or roads deviating from the direct road somewhere north of Ipswich, running north-east to the vicinity of Yoxford and Dunwich, and thence running north-west to rejoin the direct route near Caister. They consist of the place-name Stratford between Wickham Market and Saxmundham; the significantly if intermittently straight road by Coddendam, Pettaugh, Earl Soham and Peasenhall; the similar road from Peasenhall to Weybread; and the name Stone Street applied to the road between Halesworth and Bungay. These seem to indicate two roughly parallel routes, the one east of and outside the other, but, as all the evidence for them is in Suffolk, we cannot here discuss them further. It is, however, necessary to say thus much, because they afford certain indications for Norfolk. If there was a road from Peasenhall to Weybread, it probably entered Norfolk at Needham or Harleston, and soon joined the direct route from Colchester to Caister. If there was a road by Halesworth and Bungay, it must have entered the county near Bungay, and, perhaps passing the Street Farm at Bergh Apton, have joined the direct route near the gates of Caister. But till more evidence be forthcoming, we must be content with saying that there was a longer road from Colchester to Caister, but that its course, at least in Norfolk, is unknown.¹

3. Northwards from Caister. Some antiquaries suppose that a road ran from Caister (or Norwich) by Stratton Strawless to Cromer and a Roman fort there. The idea, in this form, is a mere guess, unworthy of attention, for there is no Roman fort near Cromer and no trace of the road anywhere. However, the name Stratton and the remains at Rippon Hall, Brampton and Buxton, immediately north of Stratton, may indicate a not yet discovered road from Caister to Brampton. There is a Street Farm at Brampton.

4. Eastwards from Caister. A road has often been supposed to have run from Caister (or Norwich) eastwards to Downham Market and thence across the Cambridgeshire fens, a little north of March, to Peterborough and the Roman 'station' at Chesterton. The western or Cambridgeshire part of this road is tolerably well attested; parts of it have been properly traced and its nature ascertained by excavation, and though nothing has been found to prove definitely its Roman origin, it is cer-

¹ Camden thought to trace the longer route by a westerly deviation, through Thetford, and many writers have followed him. But there are no Roman remains known at Thetford or other places selected for this route, and there is no trace whatever of the road at any point (see the Index under Thetford).

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tainly an ancient road and might be Roman. The eastern part, from Downham Market to Caister, 40 miles in length, is a much more unsatisfactory matter. A piece of old road has been noted at Hethersett, five miles west of Caister, but its Roman character has never been proved and it stands entirely alone.¹ The eighteenth century writers carried the road right on to the east coast at Happisburgh, but this is the wildest fancy.

5. The Peddar's Way. The Peddar's Way—Norfolk dialect for the Pedlar's Way—runs through the Eastern uplands of Norfolk in a south-south-easterly direction from the very north to the very south of the county, a distance of some 40 miles. It is traceable nearly the whole way by the straightness of certain modern roads and the straight lines of certain parish boundaries. It is said by most writers to commence at Holme, a village near the coast about 3 miles north-east of Hunstanton, but for 6 miles its course is not certain. From Fring to Castleacre (14 miles) it is still in use, and for 6 miles south of Fring it forms a parish boundary. South of Castleacre it can be traced as a road and the parish boundary of Swaffham and Sporle, and further south as the boundary of Tottington, East Wretham, Bridgham and Brettenham parishes, and occasionally as a road. On Galley Hill, a mile north of Wretham railway station, its direction becomes slightly more southerly, and it crosses the Little Ouse into Suffolk in Riddlesworth parish.² In Suffolk it is less easily traceable: it appears to run towards the Roman remains at Stowlangtoft, but its further course is doubtful. It is in some respects a puzzling road. Though several Roman sites are near its course and one, that of Fring (p. 297), is just at the point where it becomes uncertain, it can hardly have been constructed only for these sites. It has been suggested that it was intended to provide communication with Lincolnshire by means of a ferry from Holme to Wainfleet or Skegness. This is hardly credible. The mouth of the Wash between the places named is more than 12 miles wide and its navigation is dangerous and difficult. Even an antiquary, when it came to the test of trial, would shrink from such a trajetuctus. We may rather incline to believe that the Peddar's Way has some relation to the fort at Brancaster, a little more than four miles west of Holme. It is true that it cannot be traced there and that there is no apparent reason, geographical or other, why it should not have gone there and be traceable thither. But there is no other known road

¹ For Hethersett see the Index. For the Fen road, supposed to be first visible at Denver, see William Dugdale's *History of Imbanking* (London, 1662 and 1772), pp. 174, 175; letter by Dugdale to Sir Thos. Browne of November, 1658, in Browne's Correspondence; *Journal of the British Archaeological Association*, xxxv. 265; *Cambridge Antiquarian Communications*, iv. 205; Samuel Wells, *Hist. of the Drainage of Bedford Level* (London, 1830), i. 61; E. M. Beloe, *The Great Fen Road* (Lynn, 1889), an account of excavations, read to Cambridge Antiq. Society, November 18th, 1889. Babington in his *Ancient Cambridgeshire* (ed. 2, p. 53) says he saw traces of the road at Denver in 1853; see *Cambr. Antiq. Society's Reports* of May 22, 1854, p. 6; May 24, 1855, p. 10.

² It is so often marked wrong in the maps that I have described its course more fully than would otherwise be needed. Gough (edition of Camden, Introduction) takes it to Ely, and Babington to Mildenhall, but both views are impossible. Mr. Beloe discusses the road in the *Cambridge Antiq. Society's Communications* (ix. 77-95), and seems to consider it British. The course marked on his map differs somewhat from that which I have pointed out.

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to Brancaster and the road has no other visible purpose. In that case we may call the Peddar's Way a military route. In any case we shall consider it a Roman road. Its unswerving straightness uphill and downhill for forty miles, forbid us to assign to it any other origin.

6. Other Roman roads to Brancaster have been alleged by various writers, but so far as I can discover, without any proper evidence. One such is taken from Cambridge to Ely, Littleport, Southrey, Denver, and so to Brancaster, and is often called Akeman Street. But the name appears to have no authority whatsoever, and the road, except perhaps between Cambridge and Ely, is a mere fiction. Another road has been taken from Caister-by-Norwich through North Elmham and South Creyke, but, as I shall show in the Index, the claims of both these places to be Roman sites are imaginary, and of the supposed road there is no trace whatsoever. Other roads have been suggested, but without evidence or probability. Neglecting such, the dreams of irresponsible fancy, we pass to the fact of Brancaster.

6. MILITARY REMAINS—BRANCASTER, ETC.

We have now described the normal features of Roman Norfolk, its town and country life, so far as it had any, and its roads, so far as we know them. There is left one special feature to which the Peddar's Way has led us, the vestiges of military occupation at Brancaster, to the consideration of which we may append any account of one or two other alleged military sites.

In general, the south of England contains very few traces of the Roman army which garrisoned the province of Britain. That garrison was posted almost wholly in the north and west, beyond the Severn and the Humber, and east and south of these rivers fortresses and forts and cantonments were few and far between. But in the fourth century, when Saxon pirates were plundering the eastern and southern coasts, a frontier defence became necessary in these quarters. Accordingly, a 'comes litoris Saxonici' was established, with a staff and nine regiments stationed in nine forts.¹ Eight of these forts have been identified: they extend from Brancaster on the edge of the Wash to Pevensey in Sussex, and Brancaster engages our attention as the only fort of the Saxon Shore in Norfolk. It was the Roman Branodunum, as the similarity of the names has caused almost all antiquaries to agree, and at Branodunum, as the *Notitia* tells us, lay a regiment of *Equites Dalmatæ*.² Its object is plain from its position. It watched for invaders who might enter the Wash or one of the little harbours which dot the north coast of Norfolk from Brancaster eastwards to Blakeney.

¹ I make no apology for asserting that the *Litus Saxonicum* was the shore attacked by the pirates, and not (as some hold) the shore on which Saxons had settled. We have no evidence whatsoever that Saxons had settled in Britain by the time when the defence of this shore was organized, and the phrase itself does not by any means necessarily mean 'a shore inhabited by Saxons.' The French shore of Newfoundland is certainly not the shore on which the French have settled.

² *Notitia Dignitatum Occid.*, xxviii. The work as a whole dates from after A.D. 400, but parts may be earlier. The establishment of the Saxon Shore cannot however have been earlier than about A.D. 300.

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The site of Branodunum is at the 'Wreck,' or 'Rack' Hill, a short distance to the east of Brancaster village, between the modern high road and the creek which forms the western arm of Brancaster harbour (fig. 17). It is still distinguishable by the fragments of brick and pottery which lie about it, and by the slight but perceptible elevation of its area; but its walls and buildings have long ago vanished, and little of them seems to have been visible even in Camden's days. In size and outline the fort is stated to have been a square of 570 feet, that is $7\frac{1}{2}$ acres, with gateways in the eastern and western sides, but no precise measurements have ever been secured, and I am inclined to consider these figures as somewhat too small.¹ Excavations made in 1846 showed that the north-east angle of the fort was rounded, and had within it a small rectangular guard-chamber or turret, and presumably the other three angles were similar (fig. 19). At the same time, it was found that the walls were 11 feet thick, constructed of concrete, and built with facing and bonding-courses of a local white sandstone (fig. 18). At the eastern gate, which apparently had flanking bastions, a road 33 feet wide was found to enter the

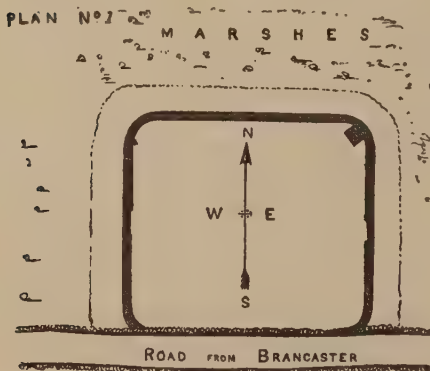


FIG. 17. PLAN OF BRANCASTER.

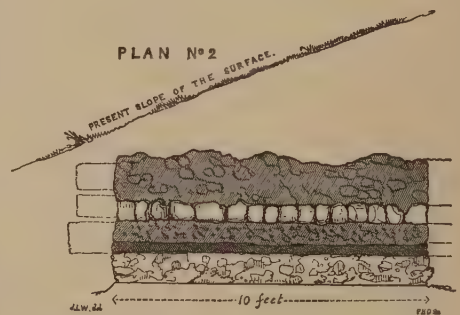


FIG. 18. SECTION OF WALL, BRANCASTER.

fort, and run 360 feet across it westwards. Some slight indications of structures within the fort were also noted, but much yet remains to be explored. The minor objects found at various dates are not very important or numerous—Samian and other pottery; objects of bone and metal, including a statuette of Mercury, 3 inches high; a fourth-century Christian ring, inscribed, *VIVAS IN DEO* (fig. 20). Many coins have been discovered, but few precisely recorded: a Republican *denarius* (Janus + trophy), another of Claudius, and another of Pius, a 'Third Brass' of Carausius, and one of Chlorus: many more appear to be 'Third Brass'

¹ I take them from Mr. J. Lee Warner's paper in the Norwich vol. of the *Archæological Institute*. But the plan in that volume (p. 13) suggests that the internal length from east to west was about 600 feet. The length from north to south must be somewhat the same but, owing to the destruction of the south side, is perhaps hardly ascertainable.

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of the late third or the fourth century, and Spelman mentions two bronze vases found with coins, possibly a hoard.¹

Beyond the fact that it was one of the forts of the Saxon Shore in the fourth century, the history of the place is quite unknown. The square or nearly square shape and the rounded angles of the fort have been adduced to prove that it was first erected in the early part of the Roman occupation, and they are not inconsistent with that notion, though they assuredly do not prove it. The recorded coins, were they more numerous, might also indicate that the site was early occupied, if not fortified. It were easy to conjecture that the fort and the Peddar's Way were alike constructed after the insurrection of A.D. 61 to hold the district down. On the other hand the bastions attributed to the east gate would probably be fourth-century work. We require excavation, as so often in Norfolk: till the spade helps us, we can hardly do more than affirm that here in the fourth century stood a fort.

The next fort of the Saxon Shore in geographical order is Gariannonum, Burgh Castle near Yarmouth, warden of the waterways which the Waveney and the Yare open into the heart of the eastern counties. It is itself in Suffolk, and we need not describe here its massive and stately ruins.



FIG. 20.

But detached forts in connection with it have been supposed at two sites in Norfolk—Caister-by-Yarmouth and Reedham on the Yare, and a word is due to them in this context. Neither place, so far as the present writer can judge, deserves on the evidence of recorded discoveries to be called a military site. At Caister many Roman remains have been found, but no trace of fortifications (see p. 293). At Reedham there are said to have been earthworks once, but no record of their character survives, and earthworks, of whatever character, can hardly be connected with the fourth century. Besides, the Roman coins found at Reedham

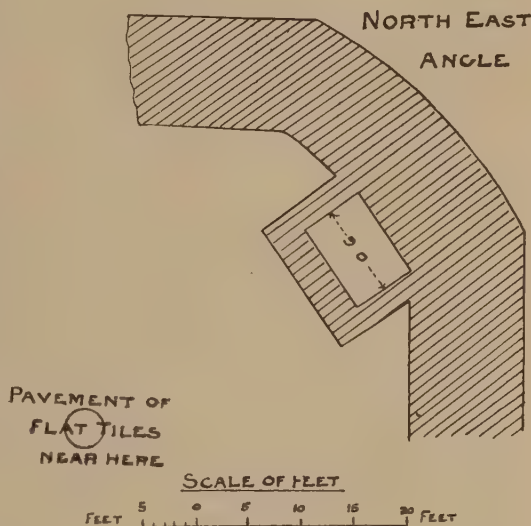


FIG. 19.

¹ Camden (ed. Gough, 1806) ii. 179, 197; Spelman's *Icenia* (*Posthumous Works*, p. 148); Blomefield, x. 298; *Archæologia*, xii. 134, xxiii. 361; Norwich vol. of the Arch. Institute, pp. 9-16; *Journal of the British Arch. Association*, xxxvi. 115 and *Corpus Inscriptionum Latin.*, vii. 1,307 (inscribed ring); C. Roach Smith, *Collectanea antiqua*, vii. 159; Dawson Turner, MS. 23,026, p. 104 (Mercury and coins of Pius, Carausius and Chlorus, found 1806). A few objects of no great importance are in the Norwich Museum. What the 'copper-gilt ensign' found in 1763 may be (*Gentleman's Magazine* (1779), ii. 591) I do not know. Wisbech Museum has seven 'Third Brass' of Carausius from Brancaster.

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evidence an occupation before rather than after A.D. 300. Nor do any general considerations require us to assume that Burgh Castle was supported by subsidiary posts at Caister or Reedham or anywhere else. The other forts of the Saxon Shore stood each by itself, alone, and Burgh Castle would naturally be like the rest. No doubt the absence of out-posts may have constituted a weakness in the defences of the Shore, but that weakness is significant. The Saxon Shore represented what the government was able to do, not what it may have wished to do, in the direction of protecting south-eastern Britain. We are liable to conceal the true position of the Roman military power in the fourth century if we fill up its deficiencies with specious theorizing. Should future discoveries some day demonstrate that Reedham and Caister were fourth-century forts, we shall of course raise a little our conception of the strength of the coast defences. Meanwhile we may perhaps venture to think that the Wash and the coasts of Norfolk and Suffolk were not altogether ill-protected. The two great gateways to the interior, the door of the Wash and the door of Yarmouth, were at any rate guarded, and the part that lay undefended, the coast for many miles east and west of Cromer, was neither easy to land upon nor contiguous to rich and attractive districts. In this detail, as in others, we recognize that the Romano-British life in Norfolk was poor and scanty.

7. MISCELLANEOUS

Hitherto we have dealt with some form or other of settled life in Roman Norfolk. We have been obliged to doubt in several cases what form of settled life our remains represent, but in every case the facts or alleged facts have seemed to indicate permanence and regular occupation. There remain to be noticed many scattered finds, coins, urns, objects in metal, and much else which we cannot fix to any definite place in the Romano-British civilization of Norfolk. Many, perhaps most of these, are in all probability due to mere chance and isolated circumstances: some may be so imperfectly known that we miss their real meaning. Such objects do not and cannot materially assist our conceptions of Roman Norfolk. Hoards of coins or of bronze ornaments, for instance, tell us very little if they stand alone. Hoards of coins have their own value for the students of political economy, since they often reveal secrets in the history of the Roman currency. But they do not so often illustrate the occupation or character of the districts in which they are found. Sometimes they occur in the close vicinity of dwellings, buried—for instance—in a back garden which the owner had constantly under his eye. But they occur no less often in places remote from any known Romano-British habitation: they have been lost or purposely hidden in a secluded and unfrequented spot. We shall therefore summarize all such sporadic and accidental remains in the alphabetical list with which this article concludes, and we shall perforce include in that list some discoveries which, if we knew them better, we might not perhaps call accidental.

But one or two of these sporadic finds merit a fuller notice than an

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alphabetical summary permits, and we may therefore briefly describe them in this section before giving the actual summary. One such is the hoard of 'Third Brass' coins of the third century which was found in June, 1878, at Baconsthorpe, three miles south-east of Holt. Roman remains which may possibly indicate a dwelling have been noticed near Baconsthorpe Hall, as we have already observed above (p. 297). The hoard was found in ploughing, about half a mile east of the Hall. It was contained in a largish urn, said to have been 14 inches high and 36 inches in circumference, and it consisted of about 17,000 coins varying in date from Gordian III. (A.D. 238) to Aurelian (270-275), but also including a very few earlier than Gordian. Putting together the notices of the hoard which have been published, we find that in 3,736 recorded coins the following Emperors are represented:—

Nerva . . . 1	Trajan Decius . . . 6	Mariniana . . . 2	Lælianus . . . 2
Antoninus . . 1	Herennius . . . 2	Gallienus . . . 306	Victorinus. 1,127
Macrinus . . . 1	Etruscilla . . . 5	Saloninus . . . 87	Marius . . . 28
Julia Mæsa . . 1	Trebonianus . . 13	Salonina . . . 113	Tetricus I. & II. 2
Gordian . . . 11	Volusianus . . 18	Quietus . . . 1	Claudius . . . 70
Philip I. & II. 14	Æmilianus . . . 5	Postumus . . 1,785	Quintillus . . 10
Otacilia . . . 1	Valerian . . . 121	Postumus (son) ?	Aurelian . . . 2

The hoard is a variety of a type common in Britain and North Gaul, the instances of which seem to have been lost or buried soon after the accession of Aurelian. We may perhaps connect them with the troublous condition of the times, and in particular the struggle between Aurelian and his rival Tetricus, who held Britain and northern Gaul till Aurelian overthrew him in 274. In its composition the Baconsthorpe hoard seems to resemble other hoards of the same type, but as only a quarter of its coins have been examined, it is difficult to judge of this in detail. We may however wonder at the presence of a coin of Nerva and the absence of the issues of Tetricus. The size of the hoard has caused some astonishment, and it has been supposed to represent military or other public treasure. But large hoards are not so uncommon that we need necessarily adopt this explanation, and in some cases of very large hoards of which we have details, we may be certain that we are dealing with private accumulations. It should be remembered that the value of 'Third Brass' coins at the end of the third century was very small, and one gold piece was probably equivalent to many hundreds or even thousands of them.¹

Another interesting hoard, not of coins but of bronze objects and ornaments, was found in 1844 in a sandhill, on ground which used to be part of Stow Heath, at Felmingham, between Aylsham and North Walsham. Labourers, we are told, were carting sand away from the hill when the soil caved in and exposed to view two urns, one inverted over the

¹ *Archæological Journal*, xxxviii. 433; *Norfolk Archæology*, ix. 25; *Numismatic Chronicle*, xx. (1880) 75; Norwich Museum has 500 of the coins, and about 8,000-9,000 are said to have come into the hands of Mr. J. T. Mott, the landowner. For similar hoards see Mommsen's *Histoire de la Monnaie romaine* (ed. Blacas), iii. 112 foll., and Blanchet's *Trésors des Monnaies romaines en Gaule*. The value of 'Third Brass' about 260-300 A.D. is, for many reasons, impossible to calculate exactly. But see Mommsen's *Hermes*, xxv. pp. 26 foll.



FIG. 21. BRONZE OBJECTS FROM FELMINGHAM.

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other, resting on two tiles (fig. 21). The lower urn which was 8 inches high, of a bowl or pot shape and adorned with ring-handles (No. 19), contained a curious collection of about twenty little objects, all with one or two exceptions of bronze. I may mention a small bust of Helioserapis (the Sun and Serapis amalgamated, No. 11), a helmeted head—perhaps of Minerva (No. 5), a statuette 3 inches high of a Lar with his drinking-horn and cup (a common and conventional type, No. 7), a bearded head which I cannot identify (No. 10), some fibulæ, two bases or stands for statuettes (Nos. 15, 16), and the like. A silver coin of Valerianus Cæsar, that is, Saloninus



FIG. 22. SANDHILL CONTAINING URNS, FELMINGHAM.

the son of Gallienus, minted A.D. 253–259, gives some clue to the date of the whole hoard. A coin of Vespasian was found near the hoard but apparently had no connection with it. A year or two later another discovery was made in the same spot—seventeen urns, all rude and mostly of ordinary dark clay, and a rude earthenware ‘candlestick’ of

a common type, all lying together inside a sand heap, in total disorder but for the most part unbroken; a bronze coin, probably of Septimius Severus, was in one urn, pieces of iron in another, but no bones or ashes or other objects (figs. 22, 23). Those who described the finds when they were made attributed them to the sepulchre of a priest or flamen, but they are nei-



FIG. 23. POTTERY FROM THE SANDHILL.

ther sepulchral nor have they anything to do with a flamen. The bronze objects are a few household treasures, hidden either by the owner or by some one who had robbed him; the urns found subsequently seem rather to be a rubbish-heap, and suggest that some sort of habitation may have stood near.¹

¹ For the bronze hoard see *Archæological Journal*, i. 381, 385; Richard Hart, *The Antiquities of Norfolk* (Norwich, 1844) pp. iii.–viii., with two plates and fanciful explanations. The head of Helioserapis (wrongly described by Hart as Fortuna Barbata) is figured by Dawson Turner, MS. 23,029, p. 193, and in the Norwich vol. of the Institute, p. xxvii. The coin is Cohen No. 26. For the later find of urns see *Archæological Journal*, iii. 246, and drawings in Dawson Turner's MS. 23,029, pp. 190 foll.

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Still more isolated is a discovery made in December, 1839, at Second Alder Carr between Mileham and Longham—a square silver dish, measuring 15 inches each way and weighing 69 ounces, now preserved in the British Museum. It is fine, if not quite the finest work, and though only a single piece, is well worthy to be put beside the other silver plate which has been found in Roman Britain (fig. 24). Unfortunately the ornament does not give any certain clue to its date, nor can we tell how it came to Mileham, whether lost or stolen. Archæologists have indeed professed to see some Roman earthworks at Mileham, and one recent writer connects them with other works or supposed works as illustrating



FIG. 25. ORNAMENT AND INSCRIPTION ON PEWTER DISH FROM WELNEY.

the progress of the Roman conquest of Norfolk. But nothing Roman has ever been found in these earthworks, and there is no real reason to call them Roman.¹

A similar but less precious find, is a large pewter dish found in 1864, 14 inches below the surface about 200 yards east of the New Bedford river (the Hundredfoot river) near Welney. It is a dish 29 inches in diameter and 30 lb. in weight, made of an admixture of 80 parts of tin to 18·5 of lead, with a few traces of iron (fig. 25). Round

¹ *Archæologia*, xxix. 389 (plate not quite accurate). For the earthworks see *Norfolk Archæology*, viii. 12; *Archæological Journal*, xlv. 208, 342.

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SILVER DISH FOUND AT MILEHAM.

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it was an inscription which has not been adequately deciphered but which may be **VTERE FELIX**. This is one of the many metal dishes and objects of various dates which have been found in the Fen country and especially in Cambridgeshire. Struck by these finds one writer has ventured to conjecture that 'in earlier times the Fens were salubrious and productive, presenting to the Roman colonist attractive sites of residence, and extensively occupied by luxurious Roman settlers even to the latest period of Roman dominion in Britain.' The actual remains justify no such conclusion. They are of all dates and ages, and are due to the nature of the Fenland soil. Whatever the traveller lost as he made his way over the marshes, whatever the robber brought back to his inaccessible lair and cached in a hidden spot, was all preserved almost intact by the dampness of the ground. Where chemical action is not set up, water or wet soil forms one of the best preservatives of ancient objects: it keeps in its air-tight embrace alike the leather boot and the metal dish and the tree with its bark as fresh as it grew. At Welney, at any rate, we have no trace of luxurious settlers or of attractive sites of residence. A hoard of coins was found near the place in 1718; three other pewter vessels, two probably Roman but of little interest, were found in 1843 half a mile from the New Bedford river. For the rest the site is isolated.¹

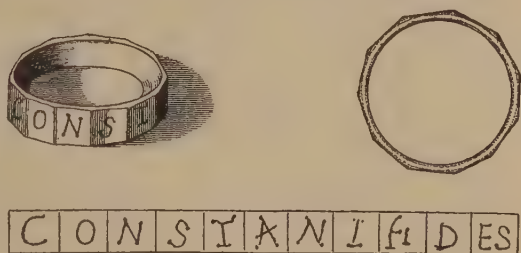


FIG. 26. GOLD RING FROM PORINGLAND HEATH.

I may also mention here a gold thumb-ring found in 1820 on Poringland Heath, two miles south-east of Caister-by-Norwich (fig. 26).² It is now in the Norwich Museum, where I have seen it. On eleven facets it bears the letters—

C | O | N | S | T | A | N | T | I | F | I | D | E | S

Constant(i) Fides

The ring belongs to a well recognized class. A similar ring was ploughed up long ago at Birchington in Thanet, and is said to bear on eleven facets the inscription **FIDES CONSTANI**. Others found on the continent are inscribed **FIDEM CONSTANTINO**. The French antiquary, M. Mowat, connects such rings with the swearing of allegiance to the Emperor, and supposes that they would be given to officers on the occasion, while coins with such legends as **FIDES MILITUM** would be issued for general largesses. It is also possible that it may have been a loyal

¹ For the inscribed dish found in 1864, see *Archæological Journal*, xxvii. 75, 98; *Proceedings of the Society of Antiquaries*, 2nd series, iv. (1870) 425; Skertchley's *Fenland*, p. 474, with a plate. The object itself is said to be now in possession of Mr. Albert Goodman of St. Ives. For the hoard of coins and other pewter vessels, see the Index below.

² This figure reproduced from *Archæologia* is not quite accurate, but gives the general character of the ring adequately.

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fashion to wear such rings at one period. Whether the Poringland ring referred to Constantius Chlorus, or his son Constantine the Great, or some other member of the dynasty is not clear. In any case it belongs to the first half of the fourth century.¹

Lastly, a word is due to a very puzzling and curious object which may or may not have been found at North Elmham. It is an urn, to all appearances a purely English urn, formerly in the collection of the Rev. Bryan Faussett and now in the Liverpool Museum (fig. 27). Though an English urn, it bears outside it a Roman inscription in rude and not altogether Roman letters, as follows :

D·M
L·ÆLIAE
RUFINAE
VIXIT. A. $\overline{\text{XIII}}$
M. $\overline{\text{III}}$. D. $\overline{\text{VI}}$

that is—*D(is) M(anibus) Læliæ Rufinæ : vixit a(nnos) xiii, m(enses) iii, d(ies) vi.* ‘To the memory of Lælia Rufina, who lived 13 years, 3 months, and 6 days.’ Its origin is uncertain, but as the urn accords well in character with those found in Norfolk and particularly at North Elmham, and as Faussett records receiving two urns from Elmham, Mr. C. R. Smith conjectures that this urn came from that place. At the same time, as he admits, it is strange that Faussett, in his record, said nothing about the inscription, which is quite plain and conspicuous.

Now Roman remains have been found at North Elmham, for which I may refer to the Index at the end of this article—a hoard of coins and, as is alleged, some burial urns. But we may fairly look on the inscribed urn with suspicion. For in the first place, its origin is obscure. In the second place, its ceramic character is unquestionably post-Roman. And thirdly, the inscription itself is of a somewhat unexpected kind. Such an inscription, mentioning nothing but the dead person’s name and the exact years, months and days of his or her life, is common enough in Rome : it belongs to a type represented by thousands of instances in the columbaria and cemeteries of the great city. But the type spread little. It is almost unknown in Britain, and we certainly should not expect to find it on a burial urn or in a remote part of the British province. Add to this the fact that the lettering is by no means above suspicion, and it becomes impossible to avoid the fear that the inscription may have been added to the urn by a modern hand ; it may indeed be a copy of a genuine inscription actually found in Rome. In any case, it must not count among the Roman remains of Norfolk.²

¹ The ring is described *Archæologia*, xxi. 547 (with illustration), xxiii. 366 ; *Corpus Inscriptionum Latinarum*, vii. 1,301. For the whole class of rings see Mowat, *Mémoires de la Société des Antiquaires de la France*, x. (1889) 336, and my notes in the *Archæological Journal*, 50, 282.

² See C. Roach Smith, *Collectanea Antiqua*, v. 116–121 ; Hübner, *Corpus Inscriptionum Latinarum*, vii. 94 ; Wright, *Intellectual Observer*, vi. 121. Smith held the urns to be the work of the earliest Teutonic tribes to arrive in Britain—before (apparently) the end of the Roman dominion. Hübner suggests that the urns are not really English urns at all. Neither suggestion seems in the least likely. No one, so far as I know, has called attention to the peculiar character of the inscription : epigraphists who know Romano-British inscriptions will however recognize that it is a serious question.



FIG. 27. URN ALLEGED TO HAVE BEEN FOUND AT NORTH ELMHAM.

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8. INDEX

The following is an alphabetical list of the principal places where Roman remains have been found, or supposed, in Norfolk. For the places where vestiges of permanent occupation have been found, it has seemed sufficient to refer to the preceding descriptions; for the rest, the character of the remains is briefly indicated, and the chief authorities for them named.

- ALBOROUGH . . . The Roman remains ascribed to this site in Mr. Rye's Index belong to Aldborough (Boroughbridge) in Yorkshire.
- ASHILL Villa, curious deposit of pottery in well : p. 295.
- ATTLEBOROUGH . . Disk of burnt clay (3 inches in diam.), inscribed on one side with diagonal lines and the letters **S.C.V.R.**, on the other side with the letters **H. IMP... (XP?)**. Quoted as Roman in the Norwich vol. of the Institute, p. xxviii., and in *Ephemeris Epigraphica*, iv. p. 208. But probably not Roman.
- BACONSTHORPE . . Perhaps villa : p. 297. Hoard : p. 307.

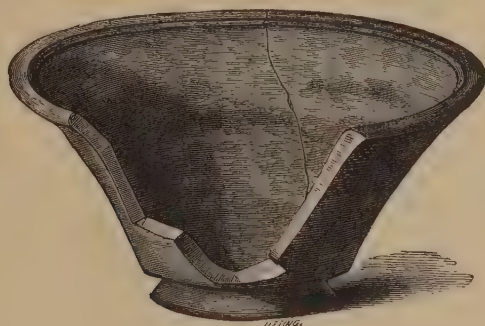


FIG. 28.

- BEACHAMWELL . . . Hoard found 1846, in digging sand near the Wellmore plantation : about 50 denarii in a Samian cup stamped **SOSIMIM** (fig. 28), covered by a Samian saucer. Of 36 coins examined there were : 1 Republican (Antonia), 5 Vespasian, 2 Domitian, 1 Nerva, 3 or 4 Trajan, 7 or 8 Hadrian, 7 Pius, 3 Faustina senior, 2 Marcus, 1 Faustina junior, 3 Verus, 1 Commodus Cæsar. The hoard must have been deposited about A.D. 175 [*Norfolk Archæology*, vii. 128; *Numismatic Chronicle*, x. (1848) 102; *Journal of the British Archæological Association*, ii. 88].
- BEESTON REGIS . . Pits, cinders, slag refuse, Romano-British potsherds, supposed to be traces of rude ironworkings [*Norfolk Archæology*, iii. 237; *Archæological Journal*, xl. 286]. See Weybourne.
- BERGH APTON . . . Both Venta Icenorum and Gariannonum have been located here [Suckling's *Suffolk*, i. 329, etc.] and Roman occupation asserted [*Archæologia*, xxiii. 366]. But nothing has really been found. There is a Street Farm in the parish [*Ordnance Survey*, lxxvi. S.W.].
- BESSINGHAM . . . Pottery and bones found in 1870 in sinking a sandpit, perhaps a burial [*Norfolk Archæology*, vii. 372; *Proceedings of the Soc. of Antiquaries*, II. v. (1870) 32].

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- BICKERSTONE . . Alleged Roman bricks (as if a villa near) in south-east angle of ruined church [*East Anglian Notes and Queries*, i. (1862) 239]. Very doubtful.
- BILLINGFORD . . Alleged road and 'numerous antiquities including urns' [*Norfolk Archaeology*, iv. 312; *Archæologia*, xxiii. 368]. Very doubtful.
- BRAMPTON . . . On the borders of Buxton parish and near Oxnead park, much pottery, including Samian (**CRACVNA F**), glass, coin of Faustina in an urn, coins of Postumus and Tetricus, bones and ashes of human bodies. Close by, a kiln, consisting of a floor, 6 feet 9 inches square, of brick earth burnt red and hard on the spot, with 34 holes in it, and below three similar floors, each filled with urns. These were excavated by Sir Thos. Browne [*Concerning some Urnes found in Brampton Field in 1667*, in his 'Posthumous Works'; Blomefield, vi. 430; Gough's *Camden*, ii. 193. Aubrey in his *Monumenta Britannica*, ii. p. 34 (MS. Bodl. Aubrey 15) has a drawing, which indicates a kiln like that figured by C. R. Smith, *Collectanea Antiqua*, vii. plate 1]. Since then, other excavations have been made in the same place and more urns and bones found, with flint layers protecting the urns [*Archæological Journal*, iii. 249]. Dawson Turner [MS. 23,026, p. 99] figures a bit of Castor ware and a pit of a Samian *pelvis* found here, or near, and [MS. 23,053, pp. 193 foll.] some pottery, a bronze lamp and bronze statuettes of Juppiter and (perhaps) Minerva—but the lamp (as the Curator of Norwich Museum tells me) came from Pompeii and the pottery is Greek of the third century B.C. See also Buxton and Oxnead. There may have been a villa or village where these parishes meet.
- BRANCASTER . . . Fourth century fort : p. 304.
- BRANDON . . . Vase of thin bronze with holes in it, in the British Museum.
- BRETENHAM . . . Fibulæ, rings, keys, pottery, many coins (Vespasian, Nerva, Trajan, Hadrian, Marcus, Sept. Severus, Carausius, Allectus and Constantian, including 'Third Brass' of Dalmatius and Decentius—some perhaps belonging to a hoard). Blomefield put Combretonium here [Blomefield, i. 441; *Archæological Journal*, iv. 252, xxvi. 401; Norwich vol. of the Institute, liii.
- BRUNDALL . . . Dwellings : p. 297.
- BUCKENHAM . . . Pottery found in making the Norwich and Yarmouth railway [*Norfolk Archaeology*, iv. 315]. The earthworks mentioned by Harrod are not Roman [*ibid.* xi. 139]. See Lynford.
- BURGH NEXT
AYLSHAM . . . One or two bits of pottery seem to have been found here, perhaps waifs from the adjoining parish of Buxton [*Archæological Journal*, iii. 246; Dawson Turner, MS. 23,026, p. 151 (urn found 1845)].
- BUXTON . . . Pottery, on the edge of Brampton parish [Browne's *Urnburial*, ii., iii; Dawson Turner, MS. 23,026, p. 219]. See Brampton.
- CAISTER-BY-NOR-
WICH } Probably town : p. 288.
- CAISTER-BY-YAR-
MOUTH } Perhaps village : p. 293.
- CALDECOT . . Romano-British burials alleged in *Norfolk Archaeology* xii. 20.
- CARBROOKE
(GREAT) . . . Spearheads said to be Roman, really pre-Roman bronze [*Journal of the British Archaeological Association*, vi. 158; Dawson Turner, MS. 23,054, pp. 2, 10]. The little head in metal figured by Dawson Turner [p. 5], a type of young Hercules, may perhaps be comparatively modern work.
- CARLETON
ST. PETER . . . Hoard of 4 gold coins (Gratian, Maximus, Honorius) and 10 silver (Julian to Arcadius and Honorius) found in 1807 in an urn of dark ware with wavy lines of white [Norwich vol. of the Institute, pp. xxvii., liii.; *Norfolk Archaeology*, iv. 315].
- CASTLEACRE . . The imperfectly rectangular earthwork between the church and the ruins of the Saxon and Norman castle has generally been taken to

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represent a Roman earthen camp of 10 or 12 or (according to others) 22 acres in size, and various finds of Roman objects have been adduced to support this idea. But the 'camp,' so far as I can judge without excavation, is not definitely Roman in character, and hardly any of the objects seem to have been found in or near it. (i) Dr. Jessop tells me that he has noticed one or two little bits of Samian among the contents of Anglian burial urns in the north of the parish. (ii) Harrod states that Roman potsherds were unearthed in excavating the circular earthworks north and west of the keep. But these potsherds have never been seen since; they may be stray pieces from Anglian burial urns or even Anglian potsherds themselves, mistaken (as often) for Roman. (iii) Blomefield instances coins of Vespasian and Constantine—where found, he does not say—and an intaglio with an emperor's head, found in Arundel Close, over two miles to the north of the 'camp.' (iv) Woodward adds a coin of Faustina, locality omitted. (v) Mr. Fox saw bronze coins of Tetricus (1), Diocletian (6), Maximian (8), Allectus (1), Chlorus (4), and some fibulæ in the collection, now dispersed, of the late Rev. T. Jones of Sporle. Whence exactly these came is doubtful. Mr. Jones seems not to have always recorded localities minutely. I gather, however, from a letter of Mrs. Jones, that some of them were found in the north of Castleacre parish, and some in Newton, the adjoining parish to the east. (vi) The Rev. J. H. Bloom has shown me nine coins, an illegible 'First and Second Brass,' and seven 'Third Brass,' one each of Gallienus, Postumus, Allectus, Gal. Val. Maximianus, Licinius, Crispus, Constantius II., found a mile or so north of the 'camp.'

I cannot regard this meagre and scattered evidence as adequate to prove the camp Roman, still less to prove it Roman of the first century, as Mr. Fox conjectures. It indicates, at the utmost, a cottage or two, standing perhaps beside the Peddar's Way (which runs through Castleacre parish, and earthworks), somewhere about A.D. 300. But this may very likely have been to the north of the parish, and not in the vicinity of the 'camp.' See Blomefield, viii. 377; Harrod, p. 105; J. H. Bloom, *Notices Historical and Antiquarian of Castleacre* (London: 1843), p. 87; *Archæological Journal*, xlvii. 1; *Archæologia*, xxiii. 371; *Journal of the British Archæological Association*, xiv. 208. Kerrich's plans [British Museum, MS. Add. 6,735, p. 72; 6,753, p. 97] are not of much interest.

CASTLE RISING . Woodward in *Archæologia*, xxiii. 360, Harrod, p. 43, and others place here a Roman 'camp,' calling some of the earthworks Roman. But this is most unlikely, and no Roman remains have ever been found here. Spelman (*Icenia*, p. 144) mentions a coin of Constantine the Great, but only as found in the neighbourhood (*in vicinia effossus*).

CASTON . . . Silver ring and hoard of about 300 silver and bronze, found November, 1820, in digging a claypit; they lay in rolls, and included Republican (Antony), Nero, Vespasian, Titus, Domitian, Nerva, Trajan, Plotina, Hadrian, Sabina, Pius, Marcus and the elder and younger Faustina—a hoard of the type described in *Archæologia*, liv. 474-494 [*Archæologia*, xx. 577].

Also a hoard found 1816, in an urn, coins of Theodosius, Arcadius, Honorius [*ibid.* 579].

CAWSTON . . . Bronze coin of Faustina, found 1728 [Blomefield, vi. 268].

COCKLEY CLEY . . 'Third Brass' of Constantine the Great [*Norfolk Archæology*, iii. 421].

COLNEY . . . Pottery called Roman [*Norfolk Archæology*, vi. 216]. But the urns in Norwich Museum, and those shown on the plates in *Archæologia*, xiv. 1 and Dawson Turner, MS. 23,054, p. 82, are not Roman.

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- COLTISHALL . . . Fibulæ, 'Third Brass' of Constantine, pottery, skull and bones—probably a burial [*Archæologia*, xxii. 422, xxiii. 365; Norwich Museum]. A writer in the *Archæological Journal*, vi. 363, mentions 'quoinings and herringbone work of Roman-shaped brick,' but this needs confirmation.
- CREYKE (NORTH) . Two urns with 2,000 'Second' and 'Third Brass,' including 36 varieties of Constantines [*Gentleman's Magazine*, 1799, ii. 922]. There are vague and useless references to Roman remains in South Creyke in *Archæologia*, xiv. 5, xxiii. 369, perhaps from Sir Thos. Browne.
- CROWNTHORPE . . Silver thumb ring, with onyx intaglio of Mercury (?) [*Journal of the British Archæological Association*, viii. 159, xi. 79].
- DENVER Fen road: p. 302. Rude bronze statuette of Mars [British Museum].
- DEREHAM (WEST) Bits of Roman pottery, 'handbricks' [British Museum].
- DISS Coins near rectory, urn near railway station [*Norfolk Archæology*, iv. 313].
- DITCHINGHAM . . Coins [*Gentleman's Magazine*, 1807, ii. 913.
Hoard of minims, many hundreds, found 1812, in a small urn on the borders of Ditchingham and Broome parishes [*Norfolk Archæology*, iv. 313, v. 362, vi. 153; *Archæological Journal*, xxiii. 367]. Three urns and fragments of five or six others lying in a sort of open pan of native brickearth blackened by fire, 3 feet in diameter and 18 inches deep [*Norfolk Archæology*, vi. 186, with illustration; *Archæological Journal*, xx. 179 (Greville Chester, who calls it an interment)].
- DOWNHAM HEATH 'Second Brass' coin in Norwich Museum.
- DRAYTON Doubtful traces [*Norfolk Archæology*, ii. 364, vi. 379].
- DUNHAM Pottery and coins found in Great Dunham [*Norfolk Archæology*, i. 360]. Roman tiles have been suspected in Great Dunham church [Fox]. An enamelled brooch [Norwich vol. of Institute, xlii., xxvii.; Dawson Turner, MS. 23,029, p. 81] from Little Dunham. See p. 297.
- EARSHAM Pottery alleged. Saxon earthwork [*Norfolk Archæology*, iv. 313, vi. 154].
- EASTON Hoard found December, 1851, in ploughing near the Dog Inn: about 4,000 'Third Brass' in a rude urn. Of these about 2,300 are in Norwich Museum, including 2 Gallienus, 3 Victorinus, 1 Tetricus I., 2 Claudius II., 1 Diocletian, 3 Chlorus, 9 Licin us, 377 Constantine I., 38 Crispus, 347 Constantine junior, 1 Cionstans, 229 Constantius II., 9 Helena, 549 Urbs Roma, 571 Constantinopolis. Unpublished.
- EATON At Eaton Nursery, a suburb south-west of Norwich, pottery, including Samian (FAVIII) *pelves* and *amphoræ*, found before 1850 [*Norfolk Archæology*, iv. 352; Norwich Museum].
- ECCLES Coins alleged [*Archæological Journal*, iii. 250].
- EDINGTHORPE . . Burial urns found 1826, ? Roman [*Norfolk Archæology*, iii. 427].
- ELMHAM (NORTH) On the road to East Dereham, a quarter of a mile south of Elmham, a pint and a half of silver coins, including Vespasian, Domitian, Lucilla, Faustina—apparently a hoard of the type noticed at Caston. [Blomefield, ix. 491, who says that a silver ring and a bronze coin of Constantius were found in the hoard: the latter must be an error.]
- On the same side, further south, at Broomclose and Spong Hill, numerous burial urns, with small objects, tweezers, knives, bodkins, etc., found partly in 1711 [Le Neve, *Philosophical Transactions*, xxviii. (No. 337) p. 257; Blomefield, ix. 491; copied by Gough, *Add. to Camden*, ii. 202; Hart, p. 11; *Archæologia*, xviii. 391, etc]. Some of the copyists add 'Roman coins' to these urns, but this seems to be a confusion with the above-

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mentioned hoard. Probably the cemetery is wholly post-Roman. For the inscribed urn see p. 312. The earthworks at Elmham also appear to be post-Roman, and the place is not a Roman site, so far as present evidence goes.

Earthenware roundel, dug out of an ancient ditch, inscribed This is called Roman in *Gentleman's Magazine*, 1792, i. 209, 214, and *Ephemeris Epigraphica*, iii. 128, p. 144. But its date is probably later. Similar roundels with various letters and figures have been found elsewhere (ref. in *Ephemeris*, iii. 144, iv. 208); those which I have seen do not seem to me Roman.



FIG. 29. GLASS VESSEL, GELDESTON ($\frac{1}{4}$ size).

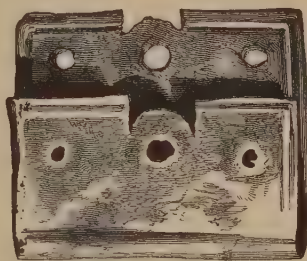


FIG. 30. BRONZE OBJECT FOR SUSPENDING BULLA OR AMULET CASE, GELDESTON (full size).



FIG. 31. BRONZE STATUETTE, HAYNFORD.



FIG. 32. URN, HEDENHAM.

ENMETH. . . . Hoard of coins (including Carausius) found near a supposed Roman road (p. 302) [Stukeley's *Itinerarium*, p. 14]. Possibly found in Cambridgeshire.

FELMINGHAM . . . Hoard of bronzes and pottery : p. 307.

FELTWELL . . . Hoard of 300 denarii 'of the early middle period.' See Caston. [*Journal of the British Archaeological Association*, xxxvi. 104.]

FINCHAM . . . Coins—bare mention in *Norfolk Archaeology*, vii. 359.

FRAMINGHAM . . . Roman tiles in church [*Archæological Journal*, vi. 363]. Requires confirmation.

FRING . . . Perhaps villa : p. 297.

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- GELDESTON . . . Interment, near the Waveney. Rude wooden cist, and in it glass *diota* (containing infant's burnt remains, 'Second Brass' of Sabina and part of a bulla), earthenware cup and potsherds [*Archæological Journal*, vi. 109, with plate; Norwich Museum; Dawson Turner, MS. 23,055, p. 126]. See figs. 29, 30.
Urn found in rebuilding chancel of church [*Archæological Journal*, xxiv. 72, with illustration], now in British Museum. Mr. C. H. Read tells me it is not Roman.
- GILLINGHAM . . . Denarius of Alex. Severus (Cohen, 364-366) [*Norfolk Archæology*, iii. 420, iv. 314].
- HARLING (EAST) . . . The urns found in the church 1872, and mentioned in the *Journal of the British Archæological Association*, xxix. 306, xxxv. 95, as Roman, are medieval.
- HAYNFORD . . . Bronze statuette (3 inches high) of Faun or Cupid [*Norfolk Archæology*, i. 366; Norwich vol. of Institute, xxvii.; *Journal of the British Archæological Association*, ii. 346; *Archæological Journal*, xi. 28—all unimportant notices]. See fig. 31.
- HEDENHAM . . . Kiln and wasters found 1858: burial urns at a little distance [*Norfolk Archæology*, vi. 149, 156; *Archæological Journal*, xviii. 374]. See fig. 32.
- HEIGHAM . . . At Stonehills, 1867, plain leaden coffin, female skeleton, two bronze rings, which however may more probably be post-Roman. Near it another skeleton and fragments of a cemented cist; near also, coin of Faustina senior; and also a small urn found 1853, now in Norwich Museum [*Norfolk Archæology*, vi. 213, 386; *Archæological Journal*, xix. 88]. Heigham is an eastern suburb of Norwich
- HEMPNALL . . . Burials east of the church, at 'The Walls,' found 1854. Very doubtful if Roman [*Norfolk Archæology*, v. 49].
- HETHERSETT . . . Bronze statuette of Hercules. Old road on farm called Plainards, supposed to be Roman, but very doubtful [*Archæologia*, xxiii. 369; Fox, *Archæological Journal*, xvi. 361].
- HOLKHAM . . . Remains at the Rabbit Farm, asserted [*Archæologia*, xxiii. 361]. Probably not Roman.
- HORNINGTOFT . . . Earthworks cleared 1852, one acre in extent, buildings inside. Also old road 15 feet wide traced for a quarter of a mile. There is no reason to think either Roman [*Norfolk Archæology*, iv. 359; G. A. Carthew, *Hundred of Launditch*, iii. 251].
- HORSEY . . . 'Second Brass' of Vespasian; urn, probably not Roman [*Norfolk Archæology*, iv. 355].
- HOWE . . . Gold coin of Nero; brick and flanged tile in church wall, as if a villa near, unless brought four miles from Caister [*Archæological Journal*, x. 62]. See p. 297.
- HUNSTANTON . . . Three urns found 1879 at new esplanade [*Cambridge Antiquarian Communications*, iv. 423].
- ICKBURGH . . . Talbot and Gale put 'Iciani' here, others 'Sitomagus,' but no Roman remains have ever been found. Blomefield's story of a 'large milliare' [ii. 233] is absurd. On the etymology, see p. 287.
- INGOLDSTHORPE . . . Republican coin of 150-100 B.C., denarius of Nero and a British coin [Blomefield, x. 339; Gough's *Add. to Camden*, ii. 198].
- KIMBERLEY . . . Largish fibula, now in Norwich Museum [Fox].
- KING'S LYNN . . . It was an old wild fancy that Catus Decianus founded Lynn [Wm. Richards, *Hist. of Lynn*, i. 312]. No Roman remains occur here. Even the recent extensive excavations for drainage have (as Mr. E. M. Beloe tells me) produced nothing. A 'First Brass' of Hadrian is said to have been found near Lynn, in cutting the new channel of the Ouse [Wisbech Museum].
- KIRBY CANE . . . Kiln, pottery, animals' bones on 'Pewter Hill' [*Norfolk Archæology*, iv. 313].
- LAKENHEATH . . . Large fibula, figured *Archæological Journal*, vi. 405.

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- LYNFORD . . . Two urns found 1720, more with bones and ashes beneath a paving of flint found 1735, all about a quarter of a mile south of Lynford Hall on the edge of Buckenham parish (*q.v.*) [Blomefield, ii. 263; Ordnance Survey Map, lxxxiii. S.W. : the latter marks also urns found 1859]. Blomefield is copied by Hart, Gough, Reynolds, etc.
- LYNG . . . Pottery and a 'First Brass' (Trajan?) [*Norfolk Archaeology*, vi. 381].
- MARSHAM . . . Urn in Norwich Museum, of black ware (Fox). Other urns, alleged road towards Brampton [*Norfolk Archaeology*, iii. 418].
- MELTON MAGNA . Hoard found in urn, 1887, on the estate of the Rev. H. E. Lombe : nineteen coins preserved range from Titus to Marcus, denarii; and the hoard was probably like that noted under Caston [Fox, *Archæological Journal*, xlv. 362].
Alleged Roman tiles in church window splays : these require confirmation [*Archæological Journal*, vi. 363].
- METHWOLD . . . Dwelling : p. 297.
- MILEHAM . . . Silver dish : p. 310.
Earthwork accepted as Roman [*Norfolk Archaeology*, viii. 12; Fox, *Archæological Journal*, xlv. 34; G. T. Clark, *ibid.* 208]. But no Roman remains have ever been found in it, and the earthwork itself has no feature which is necessarily Roman.
- MORLEY ST. . . Hoard of bronze coins (Constantine I., Licinius, etc.), once perhaps
BOTOLPH in a wooden box [*Norfolk Archaeology*, ii. 397].
- NARFORD . . . 'The Romans appear to have had a station here, many Roman bricks being found by the workmen about the Hall, and Sir Andrew Fountaine showed me a Roman vase of brass dug up in the Hall yard' [Blomefield, vi. 236 : copied by Gough, *Add. to Camden*, ii. 201; Reynolds, etc.]. One would like more evidence.
- NEWTON . . . Coins, once in possession of Mr. Jones of Sporle. See under Castle-acre.
- NORTHWOLD . . Republican coin (Lucretia) in a Saxon ornament [*Archæological Journal*, xiii. 296].
- NORWICH . . . (a) In the extreme north, at St. Augustine's Gate, a bronze lamp found in or before 1760 [Stukeley's *Diaries*, iii. 31; Gough, *Add. to Camden*, ii. 188]. Stukeley describes the lamp as like a human foot : Gough, who subsequently bought it, as like a sprawling frog; but they mean the same lamp.
(b) In the centre of the town, at the corner of Dove Street and Market Place, several urns, some of them unbroken, 'appearing never to have been used, but thrown aside by the potter for some defect'; and coins of Claudius II., Aurelian and Diocletian, found in August, 1852, at 10-13 feet deep under Messrs. Chamberlin's warehouse. Mr. Fox calls the urns sepulchral [*Norfolk Archaeology*, iv. 360; Harrod's *Castles*, p. 131, note; local newspapers; two urns now in Norwich Museum].
(c) In the same quarter, in London Street, a large earthen vase, a pan full of earth, iron scorix and charred wood, and also a second vase, both said to be Roman, found in 1862 in making the foundations of a Mr. Caley's house [*Norfolk Archaeology*, vi. 384].
(d) Near the Cathedral, on the north side, pottery [Raven's *Suffolk*, p. 27].
(e) In the south, on the east side of Ber Street, pottery found, 1843, said to be Roman [Dawson Turner, MS. 23,038, p. 137].
(f) Alleged ancient roadways : a 'regular and beaten path' underneath and older than the Castle mound [Gough, *Add. to Camden*, ii. 189; *Norfolk Archaeology*, xii. 30]; a cobble road, 12 feet under Wensum Street, descending towards the river [*ibid.* xii. 31]; a pile roadway (?) across the Wensum, between Fyebridge Street and Wensum Street [*ibid.* xiii. 217-]

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- 232, with plans]; the names 'Berstrete' and 'Holmstrete'
[W. Hudson, *How Norwich Grew* (Norwich, 1896), p. 15].
- These remains may be augmented with some found in the suburbs, Eaton, Heigham, Thorpe, etc. But they are inadequate to prove that Norwich was the site of a Romano-British town, or that permanent and definite occupation marked the spot. The idea that Norwich was ever called *Caer Guntum* may be dismissed without argument, for that name is a medieval invention.
- ORMESBY . . . Hoard of small bronze ornaments (swan's head, hand, dog's head and collar, human leg, etc.), said to have been found at Ormesby : now in the Fitch room of Norwich Museum. The date of the objects is open to question.
- OVINGTON . . . Roughly quadrangular earthwork, levelled in 1848, called a Roman camp in *Archæologia*, xxiii. 181; *Norfolk Archæology*, ii. 404; *Archæological Journal*, xlv. 342; but not at all likely to be such. Whether the pottery found elsewhere in Ovington parish is Roman I do not know [*Norfolk Archæology*, vii. 359].
- OSBURN . . . Coins, including two of Constantine [Blomefield, vi. 168; Gough, *Add. to Camden*, ii. 202, etc.]. There is no reason to put 'Iciani' here, as some writers have done.
- OXNEAD . . . Silver coins of Augustus, Vitellius, Vespasian, Trajan, Hadrian Pertinax (hoard) found in an urn 'in a grove' in the seventeenth century [Blomefield, vi. 493; Gough, *Add. to Camden*, ii. 193]. Urns (one with a face), sheep's bones, oyster-shells, coin of Volusianus, found on edge of Brampton parish [Sir Thos. Browne]. One wide-mouthed vase of grey ware is in the British Museum. See Brampton, Buxton.
- PEDDAR'S WAY . . See p. 302.
- PORINGLAND . . Inscribed gold ring : p. 311.
- POTTER HEIGHAM . Many potsherds and mounds of wood ashes [*Archæologia*, xxiii. 373].
- QUIDENHAM . . Bronze coin of Pius, found 1723 [Blomefield, vi. 337].
- REDENHALL . . Pottery, at Gaudy Hall [*Norfolk Archæology*, iv. 313].
- REEDHAM . . Permanent occupation : p. 298.
- RINGSTEAD . . There is no reason to put Venta Icenorum here.
- RIPPON HALL . . Urn [*Norfolk Archæology*, iii. 418]. Near Hevingham and Brampton (which see).
- RUDHAM (EAST) . Alleged hoard of coins.
- SAHAM TONY . . Roman 'flue,' found 1864 [*Norfolk Archæology*, vii. 349]. Mr. Fox, from private information, thinks it a kiln. Samian and other pottery found 1847 (Samian stamped *VXONISO* and *SILVANI* and *WIVCC* . . ?) [*Norfolk Archæology*, ii. 403; Norwich vol. of Institute, xxix.; Dawson Turner, MS. 23,043, pp. 76-79; Norwich Museum]. Three uninscribed pigs of lead, found in cutting down Saham wood in 1819 : assumed to be Roman [*Archæologia*, xxiii. 369; *Archæological Journal*, xxvi. 37]. The remains may be connected with the villa at Ashill.
- SCOLE . . . Coins : paved ford (?) in Waveney river [*Norfolk Archæology*, iv. 313; *Archæological Journal*, xlv. 249].
- SCULTHORPE . . Rubbish pit, containing Samian (*IANVARIVS*) and other pottery, bones of animals, etc., found 250 yards north-east of Cranmer Hall in 1881 [Fox, *Archæological Journal*, xlv. 364]. According to Sir Lawrence Jones, of Cranmer, a smother kiln and pottery were found.
- SHADWELL . . . Urns, coins [Norwich vol. of Institute, xxviii. lii.; Dawson Turner, MS. 23,060, p. 63-23,061, p. 23]. Two urns figured by Turner are in the British Museum; they are of a fine black ware, which in texture almost resembles black Wedgwood.
- SMALLBURGH . . The pottery, beads, etc., found here are post-Roman [Dawson Turner, 23,060, pp. 117, 118].

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- SOUTHREY** . . . Roman vessels and coins, 1 Domitian, 1 Postumus, 1 Constantine, 1 Urbs Roma [*Cambridge Antiquarian Society's Report* of May 2, 1853]. The British Museum has some fragments from here, and also a small hoard of illegible minims found at Little London on the borders of Southrey and Feltwell.
- STALHAM** . . . Pottery [Dawson Turner, 23,060, pp. 152-155].
- STRATTON (LONG)**. Urns and 'sepulchral hearth' (? kiln) found 1773; also 'numerous coins and other Roman antiquities' [Evans and Britton, pp. 214 foll.; Hart, p. 11; Ordnance Survey, xcvi. N.W.].
- SWAFFHAM** . . . Oval jewelled fibula, perhaps late Roman work [*Norfolk Archaeology*, v. 354; *Archæological Journal*, xiv. 287]. See fig. 33.
- Bronze handle of bucket, presented to British Museum by Greville Chester. It seems to be of very late date, and possibly a fifth century import. Compare Rygh, *Norske Oldsager*, fig. 345 = *Archæological Journal*, xxxiv. 247. A somewhat similar piece from Hod Hill is in the British Museum.
- Bronze fibula (Plowright Collection) [Fox, *Archæological Journal*, xlvi. 364; compare Dawson Turner, MS. 23,060, p. 208].
- These Swaffham finds seem scattered discoveries.
- TASBURGH** . . . Earthwork, 700 yards west of Roman road, pre-Roman [Ordnance Survey, lxxxvii. S.W.]. Coin of some Antonine emperor found inside the earthwork [Fox, *Archæological Journal*, xlvi. 364].
- THARSTON** . . . 'Coins of the lower empire' [Gough, *Add. to Camden*, ii. 188]. Perhaps error for Thurton.
- THETFORD** . . . Coins, according to Sir Thos. Browne [*Urnburial*, ch. ii.] from Hadrian to Valens. Coins of Vespasian (silver and copper), Domitian, Trajan, Pius, Faustina, Constantine I., Crispus (all copper) are mentioned by Blomefield, ii. 11, 12; Thos. Martin, *History of Thetford* (London, 1779), pp. 12, 13.
- A lamp is said by Dawson Turner, MS. 23,061, pp. 24, 25, to have been found at Thetford in 1827 under the Red Mound, and the lamp he figures is now in Norwich Museum. But the Curator tells me it was brought from Carthage, and presented by Edward Stanley, Bishop of Norwich, and it certainly has the look of a foreign object.
- Thetford has been called Sitomagus by Camden and others, and also Iciani; but it does not seem to be a Roman site at all: its earthworks are post-Roman. Camden's 'river Sit or Thet' is a piece of characteristically bad etymologizing.
- THORPE HAMLET**. Large stones with burnt earth, potsherds, iron and bronze fragments of weapons, etc., a 'Second Brass' of Nero, a bronze lamp, found in 1862-3 in garden of the Rev. W. Frost—apparently Roman and post-Roman interments mixed [Fox, *Archæological Journal*, xlvi. 365; *Norfolk Archaeology*, vi. 385]. Amphora, charcoal and calcined flints from same spot [*ibid.* vii. 349].
- Pottery in grounds of Mr. F. Ranson, Mousehold (now in Norwich Museum [*ibid.* viii. 334]).
- Thorpe Hamlet is an eastern suburb of Norwich; possibly there was a dwelling in this quarter (compare Heigham).
- THREXTON** . . . Samian and other pottery including *pelvæ* and *amphoræ*; urn found with burnt bones and coin of an Antoninus, found standing on a tiled floor, 4 feet square, in 1857, on edge of Saham Tony parish (Threxton House Coll.) [Fox, *Archæological Journal*, xlvi. 365].



FIG. 33. BROOCH FROM SWAFFHAM.

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- British and Roman coins, cornelian intaglio of Minerva, fibulæ, stamped *pelves*, etc. [*Archæological Journal*, iv. 252; *Journal of the British Archæological Association*, iv. 382, vi. 158; Dawson Turner, MS. 23,061, 40-44; Evans, *Ancient British Coins*, 382].
- Key [*Proceedings of Soc. of Antiquaries*, xii. (1889), 405; *Archæological Review*, iv. 69].. See p. 298.
- Threxton is 3 miles south of Ashill, near the Peddar's Way. There may have been some sort of habitation here, whether connected with Ashill (p. 295) or not.
- THURTON . . . Coins of Gallienus, Victorinus, Tetricus Quintillus, and others, found 1707 [John Pointer, *Britannia Romana* (Oxf. 1724), p. 41; Blomefield, x. 181; *Norfolk Archæology*, iv. 315]. Presumably a hoard of 'Third Brass.'
- UPWELL FEN . . . Hoard in two urns, found 1837, perhaps over the Cambridgeshire border [*Gentleman's Magazine*, 1838, i. 302].
- WALPOLE
ST. ANDREW Alleged aqueduct of 26 earthenware pipes, and Roman bricks, found near the sea bank in a garden, about 1725 [Parish Register of 1732; Stukeley's *Diaries*, iii. 27; Gough, *Add. to Camden*, ii. 199, etc.]. Needs confirmation very much. Roman embankment, see Appendix.
- WALSINGHAM Reynolds [*Itinerarium*, p. 469] notes urns here (from Browne), but (OLD) they are English.
- WALSOKEN . . . Two coins of Constantine I, found close to 'Roman Bank,' now in Wisbech Museum [*Cambridge Chronicle*, March 2, 1850].
- WALTON . . . 'Third Brass' of Carus in Saxon ornament [*Numismatic Chronicle*, 1865; *Proceedings*, p. 9].
- WAYFORD . . . In Chapelfield, on high ground overlooking river Ant, many lathe-turned urns of a blue grey ware [*Archæologia*, xxiii. 373]. Perhaps Roman.
- WELLS Hoard (a peck measure) of bronze coins found in the sand on the shore, Maximian, Constantine I, Constantius, etc. [*Norfolk Archæology*, iii. 421].
- WELNEY Inscribed pewter dish found 1864: p. 310. Other pewter vessels found 1843: p. 311.
Hoard of coins found in 1718, including Carausius [Stukeley's *Diaries*, ii. 23; William Watson, *Hist. of Wisbech*, p. 553; Skertchley's *Fenland*, p. 471, etc.]. The coins, or engravings of them, are said to have gone to Trinity College Library in Cambridge; but I have enquired there in vain, and the statement is, I suppose, an error.
- WESTON Hoard, 300 British, 2 Roman Republican (Antony, Cassia) [*Norfolk Archæology*, iv. 357; *Numismatic Chronicle*, xv. (1853), 98].
- WEYBOURNE . . . Between Weybourne and Cley on 'Salthouse Broad,' and at Greenborough Hill close by, pottery of Roman and perhaps other periods, kiln, etc. [*Norfolk Archæology*, iv. 355, v. 254, vi. 155]. The Ordnance Survey adds pottery at Weybourne Hope [x. N.W.].
- WHEATACRE
BURGH No Roman remains seem ever to have been found here [see *Norfolk Archæology*, iv. 314; *Archæologia*, xxiii. 364]. The road traced by Robberds [*Geological Observations on the Eastern Valleys of Norfolk*, p. 23] is imaginary. The bronze ornament assigned here by Dawson Turner [MS. 23,048, p. 36] belongs to Caister-by-Yarmouth.
- WIGHTON . . . Coins [Blomefield, ix. 206].
- WOOD DALLING . Oaken coffin, human bones, Samian (SATINVS) and other pottery; and above the interment animals' bones, the shank bones of sheep and goats being in bundles [*Gentleman's Magazine*, 1840, ii. 643; Dawson Turner, 23,049, p. 26].
- WYMONDHAM . . Salmon's conjecture for Sitomagus [*Roman Stations in Britain*, etc. London, 1726], but no Roman remains here.

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APPENDIX : THE ROMAN BANK

The embankments round the head of the Wash, which have been attributed to the Romans, lie principally within the counties of Cambridge and Lincoln. Of the whole reputed length of 150 miles, little more than one-tenth falls to Norfolk. This is the 'Roman Bank' which runs round the Hundred of Freebridge Marshland from the Ouse at Lynn to the Nene at Wisbech. Its appellation, so far as I can make out, is not very old, and probably dates from some antiquary ; but it is itself a genuinely ancient work. Unfortunately direct evidence of its age is wanting. No Roman remains have been recorded from Marshland, except a suspicious aqueduct, etc., at Walpole (see above) ; but one or two coins have been found at Walsoken close to Wisbech, and at Wisbech itself there are traces of permanent Romano-British occupation. This, however, would not prove the 'Roman Bank' to be Roman, and the evidence definitely relating to this and similar embankments is not at all satisfactory. For example, the late Professor Babington, in his *Ancient Cambridgeshire* (ed. 2, p. 89), refers to a Roman vase as found 'in the Roman Sea Bank,' near Tydd St. Mary and Tydd Gout, in Lincolnshire, but close to Wisbech. This would, of course, be evidence that at least this sea bank might plausibly be considered Roman. But Professor Babington added that the urn was in Wisbech Museum, and when I went there and asked for the urn, it proved to be beyond question medieval. In default of direct evidence, we are therefore forced back, at least for Norfolk, on the general and *a priori* point of view. If the Romans did not build it (people ask), who did so, or who could have done so ? That, however, is not a satisfactory position. We know far too little about the early history of the Fens in detail, and we can hardly venture to assert that at no period between the fifth and the eleventh centuries could sea walls have been built. On the other hand, if the Romans really erected a continuous embankment of 150 miles in length, it is probable that we should possess some definite memorial of it in the shape of an inscription or some reference to it in a historian. For the present, and in default of real evidence, the general question must remain unsettled, while, as far as Norfolk is concerned, we must admit that the actual remains recorded do not prove the 'Roman Bank' to be certainly, or even probably, a Roman work.

See E. M. Beloe in *Norfolk Archaeology*, xii. 311 ; *Journal of the British Archaeological Association*, xxxv. 12, 80, 177, 352.

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AS an integral part of East Anglia the region now called Norfolk might fairly be expected to exhibit traces of occupation by the race that eventually stamped its name on southern Britain. Local antiquities are indeed fairly numerous, and from an early date have received attention of a sort ; but so far as early Anglian history is concerned the material already accumulated is unsatisfactory in two different ways. First it must be realized that it is only in quite recent years that the characteristics distinguishing the relics of the Roman period in Britain from those of the Teutonic races who overran the empire have been adequately understood. In the eighteenth century and for some time later it was the fashion to attribute all remains of antiquity to our Roman conquerors, and this bias towards the classical has greatly impaired the evidential value of many discoveries of which nothing now remains but a faulty or misleading account. In this more scientific age our still imperfect knowledge is enhanced in value by ample facilities for illustration, which will in future witness against any false conclusions that may be drawn from the matter now in hand. Such conclusions are avowedly tentative, but archæology is now in a position to correct some views that once found much favour in the highest quarters. Peter le Neve, who was Norroy King at Arms, president of the Society of Antiquaries in the days of Queen Anne and George I. and ‘one of the most eminent preservers of our antiquities,’ thought some Anglian urns from Elmham to be more probably Roman than British ; while his colleague Dr. Stukeley, the secretary of the Society and himself no mean observer of antiquity, told us more about the urns by sketching them. Little wonder that lesser men in later days have obscured the evidence of many a discovery by trusting more to the pen than to the pencil ; and if more can now be done towards clearing up the history of our pagan ancestors, the reason must be sought in the greater facilities for reference and comparison afforded by the principal collections in the country.

The second drawback to our inquiry results from the inseparable accidents of cremation. The subject that called forth the wit and learning of Sir Thomas Browne still awaits adequate treatment ; but further discoveries and careful records can alone avail to discriminate the earliest English settlers of this country on the basis of their arms, their orna-

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ments and their funeral customs. More than one able paper by Grimm, by Kemble and by Wylie, has arrayed the classical authorities before us, and also shown cremation to have been largely practised in some parts of Europe during the early Middle Ages. But English antiquaries at least have been perforce content to recognize cremation in vaguely defined districts of the north and east of England; and their general statements have been justified from time to time by excavation and research. All are agreed that in East Anglia cremation was the rule, and it is here that the connection between the Anglian folk and urn-burial receives its fullest confirmation. All the available material goes to show that for a certain period the population east of the Fens for the most part burnt their dead; and though the name of England were proof enough, comparison with burial places north of the Humber and in the early Mercian kingdom shows that the Angles constituted the bulk of the population in these parts, and were not a small ruling class to which we might otherwise assign the extended burials that do undoubtedly occur in Norfolk and elsewhere. These are the exceptions to the general rule obtaining in East Anglia, and though they need some explanation there is no doubt that Anglian cremation is one of the ascertained facts in English archæology.

It is a commonplace perhaps not fully appreciated that 'Teutonic cremation is generally wanting in the interest and information which attends the burial of the body entire.' The weapons of the dead, their ornaments and objects of domestic life, were all but consumed in the funeral pyre, and archæology is here denied the help that is afforded by relics found with skeletons in the protecting bosom of the earth. Local variations apart, there seems sufficient evidence for the generally accepted view that in England during the Anglo-Saxon period cremation was the earlier practice and gradually gave way to the Christian rite as the Gospel spread among the Teutonic conquerors of the island. This sequence however does not necessarily imply that all who were laid in the grave unburnt had been converted to the Christian faith, for certain Teutonic graves on the continent which have the Christian orientation are considered undoubtedly heathen, and so far prove that the direction of the interments is not always a fair test of the religious convictions of the interred, however just the inference as to date.

To illustrate cremation in Norfolk it is natural to turn to those districts of north Germany from which the Angles and kindred tribes are commonly supposed to have set out to occupy south Britain. And in this connection some valuable evidence was obtained by Kemble and distinguished German archæologists who conducted extensive explorations on Lüneburg Heath and the banks of the Elbe. In a well-known article on burial and cremation¹ the author of the *Saxons in England* states that urns of precisely similar form, and with exactly the same peculiarities as those found in this country, have been discovered in Jutland and parts of Friesland, on the borders of the Elbe and Weser, and in other

¹ *Journal of Archæological Institute*, vol. xii.

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parts of Germany east of the Rhine, west of the upper Elbe and Saale, and north of the Main.¹ In Lüneburg and Verden cremation was universal and exclusive, only two skeletons occurring in three thousand interments. A striking contrast is to be found in Normandy, where the Abbé Cochet in the course of his excavations in the vicinity of Dieppe found only one case of cremation among several hundred graves. This would suggest that paganism had become extinct, but the activity of missionaries in these parts in the middle of the seventh century forbids us to conclude that the abbé came across none but Christian interments.

Norfolk however is not an extreme case, for though cremation was evidently the prevailing custom during the pagan period, there are several undoubted instances of extended burial in this part of East Anglia, and these not confined to any one locality, but occurring in various parts of the county and sometimes in connection with urn-burials. Here and there perhaps in East Anglia an intrusive settlement of adventurers had brought with them funeral rites different from those practised by their Anglian neighbours, but here was not the last refuge of Romanized natives who preserved their religion and may be their Christianity in the presence of the pagan stranger. The graves in question contain nothing that is obviously connected with Roman culture and much that is distinctively Teutonic, while they are scattered over the face of the county and no two groups occur in the same neighbourhood.

Attention has already been drawn to the unproductive nature of urn-burial from the antiquary's point of view. Rare indeed are the instances in which anything is found with the calcined bones but a shattered comb, a pair of tweezers or a string of beads; and the discovery of one or more spearheads with an urn at Pensthorpe² is almost the only exception in Norfolk. The uniformity observed in interments of this kind is a powerful argument in favour of larger and more valuable relics belonging to burials in which the rite of cremation had not been observed. This is a practical certainty where richly ornamented brooches, which must have been attached to the clothing of the dead, and in some cases still reveal the texture of the cloth, have escaped all injury, and remain to show the sumptuous fashions of the time.

On these grounds certain of the Norfolk finds can be safely classed, according to Kemble's method, as 'unburnt Teutons of the Iron age.' There is such a distinct break between the post-Roman and the Viking periods that there can be no hesitation in assigning the extended burials in Norfolk to the period between the fifth and the eighth centuries. The character of the ornamentation would be evidence enough, apart from all considerations of burial reform consequent on the acceptance of Christianity in this country. By the middle of the eighth century the use of churchyards for interments had become general, and it is reasonable to suppose that as the common folk abandoned the tombs of their fathers in the open country they were also induced to surrender the

¹ cf. Lindenschmit, *Handbuch der deutschen Alterthumskunde*, pp. 77, 106-7.

² *Norwich Museum Catalogue* (1853), p. 23.

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practice of burying weapons and ornaments with their dead. The people of Sussex were the last of the Anglo-Saxons on the mainland to be converted, and from 680 onwards it is fair to assume that the rites of paganism were gradually abolished by Christian teaching, so that the limit of date for pagan burials in Norfolk, at least among the Anglian population, is fixed on both grounds at about A.D. 700. Whether the date of these burials can be limited in the other direction depends on the accumulation of internal evidence and virtually on that alone, for written history is here unavailable, and tradition may be altogether misleading. Nor can much be gathered from the physical conditions which the early settlers would meet with in this part of Britain. In the preceding chapter the emptiness of Norfolk as regards the Roman occupation has been commented upon, and the sparsity of population attributed to its vast tracts of sandy heath and low-lying swamp. After the Roman withdrawal it is fair to assume that the maritime police became inadequate, and the coast of Norfolk, at any rate east of Brancaster, would thus be open to attack from the sea. There seem to have been few Romanized inhabitants on or near the sea-coast to check the immigration, and there is some warrant for the early occupation of East Anglia as implied in the *Anglo-Saxon Chronicle*. On the other hand the two main entrances were doubtless guarded for a certain period after 410, and the desolate condition of the intervening region at the time would hardly invite a desperate effort on the part of the barbarians. Once however the gates of Norfolk were in Anglian hands a rapid increase in wealth and population might be looked for, as the Icknield and the Peddar's Way must for ages have been recognized trade routes, and these had not been wholly superseded by the Roman roads in Norfolk.

To start from the north-west angle of the county, where one of the two main approaches from the sea had been commanded during the Roman period by the fort at Brancaster, evidences of cremation have been found at Sedgeford, a village about three miles south-east of Hunstanton. An urn with bosses round the body so characteristic of this period, is now in Norwich Castle Museum, and according to the catalogue prepared by Mr. Harrod in 1853 contained a quantity of burnt bones. A labourer engaged in carting from a pit found on the fall of some gravel from the side a line of urns standing mouth upwards and without covers, but the rest were probably destroyed. Near the park at Wormegay were found 'two most perfect Anglo-Saxon urns';¹ and further south an unornamented urn, now in the British Museum, came to light some years ago at Wereham in a gravel-pit, 14 feet from the surface.

In the spring of 1857 some workmen were raising a new bank along the boundary line dividing the parishes of Castle Acre and West Acre when they came upon several dark grey urns, varying in size and pattern, and filled with calcined bones. Many of these urns were de-

¹ *Eastern Counties Collectanea*, 1872-73, p. 185.



BROOCH AND CINERARY URNS WITH DETAILS (*British Museum*).

FIGS. 8, 9, 11, 13, 16. SHROPHAM.

FIG. 10. CAISTER-BY-NORWICH.

FIG. 12. SANTON.

FIG. 14. BROOKE.

FIG. 15. N. ELMHAM.

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stroyed, but between twenty and thirty were preserved,¹ though the contents were scattered about. Among the objects picked up on the spot were a spindle-whorl, a glass bead and almost microscopic shells, some metallic plates, perhaps portions of a mirror of the Roman pattern, two studs and fragments of a bone comb ornamented with double concentric rings. It is interesting to note that at the distance of about half a mile, in the parish of South Acre on the other side of the river Nar, could be traced earthworks of considerable size, and an ancient lane, now overgrown with bushes, runs from one spot to the other.

In 1891 the existence of an Anglo-Saxon cemetery evidently not far from this site was first suspected on some urns coming to light at the western boundary of the Priory Field ; and a thorough examination of the site was suggested by Dr. Jessopp and carried out through the liberality of Mr. Henry Willett of Brighton. The field lies about a mile and a half to the north-west of the village, bordering on the high road to King's Lynn. It covers the southern side of a gently sloping chalk hill, the surface soil rarely exceeding a foot in depth. The urns had been deposited so near the surface that in almost every instance the repeated ploughings to which the soil had been subjected had destroyed some of the mouths and necks, and in many cases shattered them so completely that they fell to pieces at the first attempt to remove them. The urns were met with in such quantities that it became impracticable to mark the exact position of each on the chart. It was clear however that they had been deposited without any regard to order or regularity, sometimes singly, frequently in pairs, sometimes in groups of four or five close together. Considerably more than fifty specimens were recovered, though only about twelve were got out whole ; all were of coarse pottery, evidently made of the sandy clay of the district, and burnt in smother kilns, which gave them the black appearance of the Roman Upchurch ware. In size they varied from a diameter of 12 inches to that of 7 or 8. Some were quite plain, but the ornament was not the same on any two specimens. The favourite design consisted of repetitions of a circle about half an inch in diameter filled with cross lines, or a larger one containing a cross of four lines with triangles near the circumference. The method adopted in all cases² was stamping with a stick or other implement cut to the required pattern. Sometimes large rough flints had been laid upon the mouth of the urn by way of protection. The urns had not been deposited upon the bare chalk, but in every instance upon a bed of mortar 6 inches deep ; and so deeply were they imbedded in this that it was often difficult to raise them without leaving the bottom of the vessel behind. In every case the urns were more or less filled with the surrounding soil, but also contained a conglomerate of broken human bones burnt and discoloured. Some also contained the thin hollow bones of a bird about the size of a rook. Very little of the skeleton remained in each

¹ Some were given to Norwich Museum by Lord Leicester. Society of Antiquaries, *Proceedings*, vol. iv. p. 172.

² Traced patterns appear in addition at Shropham (figs. 8, 11, 13).

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vessel, and fragments of skull seemed remarkably thin and delicate for an adult. Only two teeth were found and these were very small, and in many instances a tiny land-shell had found its way among the bones. Nothing of any intrinsic value had been deposited with the ashes, but several small articles, all of personal or domestic use, were recovered from the urns, comprising two bronze knives with tangs for the handle ; four pairs of small iron shears ; two needles and four pairs of bronze tweezers ; two fragments of glass vessels, one stamped with the letter R ; many bone discs¹ with shallow holes, not buttons but perhaps draughtsmen ; a coarse clay net-weight² ; beads of glass and pieces of bone combs. The find is recorded in *Norfolk Archaeology*, vol. xii.

Nothing can be said with certainty about several isolated discoveries in the county, briefly and perhaps inaccurately reported many years ago. Thus at Narborough about 1600 Blomefield relates that 'several human bones and pieces of armour were dug up at the foot of a lofty artificial hill,'³ which may have been an Anglian grave-mound ; and indeed Gough calls a number of little hills along the coast by North Creake the burying-places of Danes and Saxons.⁴ Again, the 'Roman' urns dug up at Lynford⁵ in 1720, and the small urn with bones and ashes found on a pavement of flint stones fifteen years later at the same place, suggest an Anglian burial on such a floor as that already mentioned at Castle Acre. There is, however, no doubt as to the Anglian character of the finds next to be recorded.

'In a field of Old Walsingham, not many moneths past, were digged up between fourty and fifty Vrnēs, deposited in a dry and sandy soile, not a yard deep, not farre from one another : not all strictly of one figure, but most answering these described : some containing two pounds of bones, distinguishable in skulls, ribs, jawes, thigh-bones, and teeth, with fresh impressions of their combustion. Besides the extraneous substances, like peecees of small boxes, or combes handsomely wrought, handles of small brasse instruments, brazen nippers, and in one some kinde of opale.'⁶ In Sir John Evans' edition of Sir Thomas Browne's classic is a note to demonstrate the Anglian character of these objects which are not of rare occurrence, such as thread-boxes, crystal beads or spheres and bronze tweezers. In the British Museum are two urns from the Townley collection which may possibly have come under the eye of the author of the *Hydriotaphia*.

About half a mile from Elmham, on rising ground west of the Beteley road, many urns (as fig. 15) of coarse earth have been found at a spot called Broom-close.⁷ The situation is dry, with a sandy or gravelly soil, and the river flows in the valley at no great distance. The ware was rough and uneven but generally well-burnt, some pieces having indented

¹ Specimens from Pensthorpe are noticed below (p. 335).

² Another from Brooke, now in the British Museum, is noticed later.

³ *History*, vol. vi. p. 148.

⁴ *Additions to Camden*, vol. ii. p. 114.

⁵ Blomefield, *History*, vol. ii. p. 263.

⁶ *Hydriotaphia, Urne Buriall*, chap. ii. (1658).

⁷ Blomefield, *History*, vol. ix. p. 491.

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ornament, others being plain and all of a blue or yellow colour. No covers were found, and the sizes varied, some holding a quart others twice or three times that quantity. Certain of them were very near the surface, and many were found to contain burnt bones and ashes, sometimes with fragments of metal and glass, including a clasp-knife and tweezers. In February, 1711, thirty urns containing little but dust and ashes were found by labourers, and on another occasion as many as 120 were recovered from a square rood of ground. Two urns from this site were presented to the Royal Society and another to the Society of Antiquaries by Peter le Neve, who communicated a quaint account of the discovery to the *Philosophical Transactions*.¹ The latter Society also possesses two more from the same site found about 1750. In the larger were found bones, a coin of Vespasian, and 'two pieces of brass such as are sometimes fixed on pommels of saddles.' The smaller is of finer material mixed with mica and glazed (or polished) on the surface: it was carefully guarded by stones ranged about it, and contained bones, a blade of a knife, a spearhead and iron buckle. The many cinerary urns found at Elmham were usually deposited under heaps of stones, and bedded in sand.² From Elmham also is said to have come a remarkable urn³ now in the Mayer Collection at Liverpool, but the feature which distinguishes it from its fellows adds but little to its evidential value. It may however be considered from two points of view, and its claim to have enclosed the cremated remains of a young Roman maiden has already been discredited in the preceding article. Granted that Roach Smith and Thomas Wright⁴ may have been led to welcome the discovery perhaps too readily, and to base upon it arguments that still await demonstration, there can be no doubt that the urn is of the Anglo-Saxon period, and unless archæology is totally at fault in East Anglia, once contained the ashes of an Anglian inhabitant. In the *Collectanea Antiqua*⁵ it is admitted to be strange that an inscription so clear and prominent should have escaped the eye of an experienced collector like Rev. Bryan Faussett, who makes no mention of it in his records, though the urn is no doubt one of two from Elmham which contained calcined bones, one those of an adult and the other to all appearance of a younger person. In both were a pair of tweezers and small pieces of iron and copper which seemed to be parts of brooches, and while one had also part of an ivory comb the other contained some vitreous beads. Perhaps the safest course is to ignore the lettering and class the urn with others, presumably from Elmham, drawings of which were exhibited to the Archæological Institute in 1853.⁶ These had been found full of burnt bones in what was evidently an Anglian cemetery, and being near the surface had been broken at the top by the ploughshare. The ornament consisted of impressed devices, vertical ribs and diagonal lines, and

¹ Abridged by H. Jones, 1700-20, vol. v. part 2, p. 97.

² Albert Way's *Catalogue of Antiquities*, p. 18.

³ Jewitt, *Grave-Mounds and their Contents*, pp. 217-8, fig. 327.

⁴ *Essays on Archæological Subjects*, vol. i. p. 98.

⁵ Vol. v. p. 115.

⁶ *Journal*, vol. x. p. 161.

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resembled that on urns excavated in Cambridgeshire by the Hon. R. C. Neville and represented in *Saxon Obsequies*, pll. 24-33. A specimen (fig. 15) from Elmham formerly in the collection of Sir Hans Sloane exactly corresponds to the above description and is now in the British Museum.

About twelve miles to the south at Shropham, near the course of the old highway that ran through Thetford to Norwich, several good cinerary urns (figs. 8, 16) have been found, and are now preserved in the national collection, though no details of the discovery are available. About midway between Shropham and East Dereham is Great Carbrook, where about 1844 in a grave-mound on the 'Battlefield' was found a brooch with the 'spectacle' ornament as at Sporle; and in another a number of beads of amber and glass-paste.¹ A millefiori bead² probably found on the same site has been pronounced of this period, and is no doubt one of the kind found in various parts of Europe, but not yet referred to any definite manufacturing centre. The extent of commercial operations is illustrated in an interesting way by the discovery of a millefiori disc³ with other objects in a Viking's grave at Tromsø in north Norway, well within the arctic circle.

At Hargham an urn-field is recorded⁴ which may well be of the same date as those just mentioned from the neighbouring village of Shropham. The find occurred on the estate of Sir Thos. Beavor, and consisted of twenty or thirty damaged vessels filled with calcined bones, but no remains of implements.

More to the east traces of early Anglian occupation are less apparent. Between the coast and a line drawn from North Walsham to Loddon and thence to Lowestoft the elevation of the land rarely exceeds 50 feet above the sea. The forts of Caister-by-Yarmouth and Burgh Castle were meant by the Romans to guard the easy inlets to this district afforded by the Bure, the Yare and the Waveney, which meet and join the sea at Yarmouth; but it is unlikely that such swampy tracts, exposed to pillage from the sea, would attract Teutonic settlers in any numbers. At Smallburgh in 1856 some beads of coloured glass and amber, such as are usual in Anglo-Saxon graves, were found with fragments of a vase, perhaps a cinerary urn, in levelling a mound in the Burnt Field,⁵ but this is slender evidence of occupation.

In the neighbourhood of Norwich, where the ground begins to rise, more frequent signs of Anglian settlements may be looked for. At Drayton, about four miles further up the Wensum, fragments of sepulchral pottery have often been found, and in one urn part of an iron dagger had been placed while another had a rudely-formed lid.⁶ The

¹ Figured by Dawson Turner, British Museum, Add. MS. 23,054, fols. 7, 9.

² *Journal of Archaeological Institute*, vol. ix. p. 116.

³ In British Museum.

⁴ *Norfolk Archaeology*, vol. vi. p. 380.

⁵ British Museum, Add. MS. 23,060, fol. 118, where a coloured drawing is given by Dawson Turner.

⁶ Three urns out of forty are drawn by Dawson Turner in Add. MS. 23,054, fols. 224-6. *Norfolk Archaeology*, vol. iii. p. 416.

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brow of the hill above the river near the Lodge was once covered with interments of cremated remains, but very few perfect urns have been recovered from the spot as the land had long been under cultivation before the discovery was made, and the urns had been near enough to the surface to be broken in pieces.¹ In the British Museum is a well-preserved cinerary urn from Catton, and at Norwich a square-headed brooch from the same site, two miles north of the city; while in the suburb of Thorpe about the year 1863 what appeared to be a Roman interment had been subsequently disturbed by that of an Anglian warrior, buried unburnt with spear and shield.² The occurrence of both kinds of burial in the same locality will be noticed more than once in Norfolk, but more important urn-fields must first be considered.

As long ago as 1815 urns from Markshall, three miles south of Norwich, were found and wrongly described as of Roman manufacture.³ Four were dug up near the top of a natural elevation in the parish at a distance of two to three furlongs north-west of the Roman camp at Caister St. Edmund's, and were fortunately figured in a plate accompanying the original account, so that their date and origin are no longer in doubt. Some contained calcined bones pressed down with earth, but no coins or other metal objects such as were said to have occurred in other urns discovered in this locality.⁴ Possibly these latter were from the cemetery attached to the camp, but it was probably in a meadow just to the north of it that a shallow bronze bowl⁵ of Anglo-Saxon type was discovered, and the burying-place of the Romans has yet to be located.⁶ Similar bowls have been found elsewhere in England, but especially in Kentish graves. The handles were generally of bronze, but those of the Caister specimen were apparently of iron and have disappeared. In particular it was said to resemble one from Wingham, Kent,⁷ now in the British Museum, and constitutes a single link in the chain of evidence which connects East Anglia with Kent in the early part of the seventh century. These remarkable bowls, which in many respects recall the handiwork of the Romans, are rarely found in this country outside Kent; and there as well as in several places on the Rhine have been found to contain hazel-nuts,⁸ apparently the farewell offering to the dead. An interesting example of this practice has come to light at Worms on the Rhine, where a bowl with hazel-nuts was buried under a tombstone with an unmistakably Christian inscription; and the discovery adds strength to the conviction that the pagan rites attaching to burial were not soon or easily suppressed.

Some traces of Anglian cremation have also been noticed on the

¹ *Norwich Museum Catalogue* (1853), p. 20. ² *Journal of Archaeological Institute*, vol. xlv. p. 337.

³ *Archæologia*, xviii. pl. xxviii. p. 436. Several urns from this site, perhaps including two of those figured, are in Norwich Museum.

⁴ An iron bucket and bronze tweezers from Markshall, as well as two urns from Caister-by-Norwich, are in the Castle Museum.

⁵ *Proceedings, Society of Antiquaries*, new series, i. p. 106.

⁶ *Journal of Archaeological Institute*, vol. xlv. p. 343.

⁷ Figured in Akerman's *Pagan Saxondom*, pl. x.

⁸ A bowl from Faversham, Kent, in the British Museum is so filled.

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southern border of the county. In 1870 Mr. Fitch exhibited to the Norfolk and Norwich Archæological Society a small collection of Anglian objects from Thetford apparently associated with urn-burials, but no details of the discovery are recorded.¹

Eight or nine Anglian urns were found in removing some small hillocks in a field to the north of Earsham² church, near Bungay; but all were destroyed except one, which may be that figured in *Norfolk Archæology*, vol. vi. p. 154. At the west end of the church in an adjacent meadow there used to be three or four large mounds, which apparently yielded no relics when removed; while on the north side of the churchyard, and partly within it, several Roman urns have been found.

The site of the Anglian cemetery at Pensthorpe, from which some excellent urns have been recovered, contained a number of mounds distinctly traceable over several fields.³ Cultivation has for the most part reduced these nearly to the level of the surrounding land; but their whole surface had been pierced with holes a few feet deep, in which urns were placed mouth upwards, and then covered over with earth. So numerous are the remains said to have been that the fields were strewed with fragments, and whenever the earth was cleared away for a few feet urns and burnt bones were certain to be exhumed. In one urn full of human bones were found fragments of an iron buckle⁴; in another bits of iron and glass, a bone pin, and sixteen roundels⁵ which are not very intelligible, but have been reasonably explained in the paper already referred to on the Castle Acre find, in which they also occurred. A few of the objects in question, unfortunately known as 'pulley-beads'⁶ are preserved with one of the urns in the British Museum, and in their original form were discs of bone or shale, with one side convex and the other flat, the latter having two and sometimes three holes bored near the centre. At the first glance they might easily be taken for buttons, and some antiquaries have been led astray by the well-known buttons of jet which are found so frequently in British barrows of the early Bronze period. But the resemblance is very superficial, for in the prehistoric specimens the holes are drilled through to the other face, or else meet in the centre to form a passage for the thread; while the later 'buttons' could never have been fastened on at all. They now vary in size and colour, having been more or less damaged and calcined in the funeral pyre; but originally they were about seven-tenths of an inch in diameter, with a polished surface that to this day shows traces of the lathe. Now it is obvious from their pottery that the pagan Anglians were not acquainted with the turner's wheel, and the conclusion is that these discs were not home-made. And here the remains of the Roman period in

¹ *Norfolk Archæology*, vol. vii. p. 373.

² This is misprinted as Evesham in the original account, *Proceedings*, Society of Antiquaries, new series, vol. i. p. 29.

³ *Norwich Museum Catalogue* (1853), p. 20.

⁴ Society of Antiquaries, *Proceedings*, vol. iv. p. 292.

⁵ cf. Jewitt, *Grave-Mounds and their Contents*, p. 294, fig. 484.

⁶ *Journal of Archæological Institute*, vol. xi. p. 295.

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Britain perhaps afford an explanation. Similar objects, both of bone and differently coloured glass,¹ may be seen in any large collection, and the suggestion that they were used like the modern draughtsmen has not been improved upon. The Romans have left behind them wheel-made pottery, and also hundreds of 'chucks' or waste-pieces from the turned bowls and bracelets of Kimmeridge shale in common use during their occupation of our island. These too have been saddled with an unfortunate name, that of 'coal-money.' The square socket at the centre noticeable in every case is to fix the rough lump on the lathe for turning, and a clue is thereby afforded to the meaning of the pairs of holes on the Anglian specimens: they are bored for fixing to a prong-centre.²

In mentioning the sites in Norfolk where traces of both methods of interment have been noticed, it must be realized that such discoveries are scarce, but might perhaps have been multiplied by a more diligent or extended search on occasions when skeletons or cinerary urns have come to light separately in other localities. The evidence with regard to Broome Heath is defective, but the presence of charcoal in some quantities suggests that the rite of cremation had not been quite forgotten, even if it had dwindled down into a merely symbolical act.

On the borders of Broome and Ditchingham several mounds existed about fifty years ago, and excavations in one of them were attended with the following results.³ At the depth of about three feet from the surface fragments of charcoal appeared sparingly distributed through the loose soil of which the mound was composed. At the depth of about six feet from the top were discovered the remains of a large human skeleton lying on a bed of gravel at the level of the natural soil. This skeleton was much decayed. The skull was tolerably perfect when first touched, and was of large dimensions. Adhering to it was found a small quantity of reddish brown hair. One side of the skull was stained with a bright green colour, which must have been caused by the slow decay of some object of brass or copper. The body lay nearly north-east and south-west, the head being towards the south-west. No fragment of metal or pottery appeared during the excavations, but a quantity of charcoal was discovered in removing some of the neighbouring mounds.

At Fakenham the signs are clearer. An interment had taken place at the bottom of an ancient gravel-pit, and the bones rested on the marl, covered by about four feet of the refuse soil and gravel. Not far distant runs an early trackway, now called the Long Lane, deflected in its course by the later growth of Fakenham. Upon this trackway exists an extensive cemetery, indicated by traces of mounds long since levelled, where the plough brings to light occasionally bronze tweezers, sepulchral urns, and evidence of burial by cremation. This was not the case with the interment now under notice, where the bones lay irregularly though distinct, associated with an iron blade or dagger, a cruciform brooch of

¹ Smith's *Dictionary of Greek and Roman Antiquities*, under the word 'latrunculus.'

² See, however, *Mémoires, Antiquaires du Nord*, 1878-83, p. 128.

³ *Norfolk Archaeology*, vol. v. p. 361; and *Proceedings, Society of Antiquaries*, vol. iii. p. 287.

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bronze, two small circular brooches or buckles, and two small bronze plates riveted together, which once served to pass the owner's waistbelt more readily through the buckle.¹

Excavations at Hunstanton Park² have yet to be completed, but promise interesting results. On the summit of a mound, at the depth of two or three feet, a few days' digging has brought to light about a dozen skeletons, with a number of beads, brooches, knives and spearheads, and also fragments of a cinerary urn. The bodies, which had been partially disturbed, had not been uniformly deposited, so that at present no deductions can be drawn from the discovery except that here was probably a mixture or succession of nationalities such as might be expected on the coast at the terminus of the principal trade route in the district.

The third division comprises burials in which there is no trace of cremation. Not only are the cinerary urns or their fragments entirely wanting in these cases, but the number and condition of the brooches and other relics recovered show that they have not been subjected to the intense heat of the pyre. This seems to be the case at Holkham, a spot that must have been open to indiscriminate attacks from pirates. The evidence is very scanty, but is perhaps sufficient to justify the present classification. As long ago as 1721 several skeletons, with a number of glass beads, iron spearheads and pieces of brass which were no doubt mutilated brooches, were found at the side of a hill in this parish,³ and perhaps from the same site were the three square-headed brooches sketched by Stukeley in a volume of *Miscellaneous Collections*.⁴

Three typical brooches from Sporle are figured in Akerman's *Pagan Saxondom*,⁵ and are now preserved at the Norwich Castle Museum. One is of the square-headed variety, and practically unornamented; another, of smaller dimensions, has a cruciform head which is notched like the wards of a key; and the third is a larger cruciform specimen with what has been called the 'spectacle' ornament at each extremity, consisting of rude attempts at reproducing the human face. They were found all together on the opening of some mounds on a farm called 'Petty Gards' at Sporle in 1820. The name of the farm has been considered a corruption of Peddar's Gate,⁶ and in one of the barrows which seem to have flanked the prehistoric highway known as Peddar's or Pedlar's Way seven skeletons are said to have been discovered, placed side by side; with some of these were remains of shields⁷ sufficient to show that they were circular, with wooden laths converging to the centre. To these the leather facing of the shield was apparently fastened with twine or packthread, some yards of which were preserved. The dimensions

¹ *Journal of Archaeological Institute*, vol. xxvi. p. 288.

² Mr. Hamon le Strange, the owner of the property, has kindly communicated the following particulars of his discoveries, which he intends to put on permanent record when complete.

³ Gough, *Additions to Camden*, vol. ii. p. 113.

⁴ Albert Way's *Catalogue of Antiquities* belonging to the Society of Antiquaries, 1847, p. 20.

⁵ p. 69, pl. xxxiv. fig. 1; pl. xxxix. fig. 3; and pl. xl. fig. 1.

⁶ *Norwich Museum Catalogue* (1853), p. 24.

⁷ Roach Smith, *Collectanea Antiqua*, vol. ii. p. 237.

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are not given, but the buckler here seems to have lain on the face of the warrior, while the spear was placed at the side ; and each body had been wrapped in a woollen cloak fastened at the breast. Nothing could be preserved of the shields but the boss of one of them, which had been penetrated by a spear. Some beads lay on what was thought to be the skeleton of a woman ; and in another mound was the skeleton of a horse and a large quantity of diminutive bones. Such discoveries are not uncommon in graves of this period in England and on the continent, and at least point to the closest of ties between the horse and his rider. Whatever the feeling that gave rise to the practice, whether to provide the fallen warrior with a means of transport beyond the grave, or to propitiate the goddess of the unseen world by a splendid sacrifice, it seems clear that the interments were intentionally side by side ; and it should not surprise us to find so valuable an animal slaughtered at his master's grave in a region of dry and open heaths where horse-breeding has from the earliest times been conducted on a large scale.¹

Among the antiquities from Sporle is one of a pair of bronze shanks which had evidently been joined like those figured by Roach Smith from Searby, Lincs.² This was found some time before 1847 in a grave-mound which was of large size and contained several skeletons. By the side of one of them (conjectured from the presence of beads and absence of weapons to be that of a female) lay these objects, and under them an iron buckle which seems to have been attached to something that had the appearance of a girdle, on which is impressed the texture of the cloth. On this basis Roach Smith considered the question settled, and pronounced these rather mysterious objects to be pendent girdle-ornaments somewhat analogous to the modern *châtelaine*. He compares them with continental specimens figured on his pl. lvi. A better engraving of the Sporle specimen is to be found in the Norwich volume of the *Archæological Institute*, 1851, p. xxvi., where two views are given. In the same neighbourhood, on Cotes Common two square-headed brooches³ were discovered in a mound, resembling specimens given in Akerman's *Archæological Index*, pl. xvii. figs. 3, 4, while close by at Swaffham several brooches of various dates have come to light. Some are described⁴ as of the Anglo-Saxon period and are perhaps sufficient evidence of unburnt interments at this site just off the Peddar's Way. A specimen belonging to a common Roman type is fully described in the *Norfolk Archæology*⁵ but that it may have been buried in an Anglian grave is rendered possible by the discovery of similar specimens in graves of this period, as at Long Wittenham and Frilford, Berks. Besides these last, another Swaffham brooch⁶ of somewhat later date is now in the British Museum. It is bronze of circular form with roughly incised edging, the

¹ For example, the 'great army' was horsed here in 866.

² *Collectanea Antiqua*, vol. ii. p. 234, pl. lvi. fig. 2.

³ Called 'cruciform' in Norwich volume of *Archæological Institute*, p. xxx.

⁴ *Journal of British Archæological Association*, vol. ii. p. 346.

⁵ Vol. v. p. 356.

⁶ Presented by Mr. Henry Plowright in 1854.

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centre being occupied by a very poor representation of a lion with the head turned back.

The British Museum has a few fragments of silver from Weasenham, and in 1870 acquired an interesting series from a cemetery at Brooke, midway between Norwich and Bungay. The three largest brooches are unfortunately damaged, though not apparently by fire. One is square-headed (fig. 4) and two others cruciform, one of these being of large dimensions but not of great artistic merit. Besides these are half a dozen of a common type terminating in the conventional horse's head; an equal number of ring-brooches, a pair of bracelet clasps, part of a girdle-hanger and a few glass beads; while the objects in iron comprise two shield-bosses and several spearheads. No description of the find was published but the objects in this case tell their own tale. There were also included in the purchase a small rough vase 4 inches high and a triangular lump of baked clay pierced at two of the corners, such as are commonly associated with late-Celtic remains. A similar object was discovered among the Anglian urns at Castle Acre and was called a 'net-weight,' but its precise use has yet to be determined.

To the south-east, on the north bank of the Waveney, is a group of Anglian sites of which two have already been noticed.

In a field called 'Pewter Hill' at Kirby Cane, workmen came upon a confused mass of human bones, among which were three or four spearheads, a jewelled buckle and two swords. As no further description is given and all the objects were unfortunately dispersed it is difficult to decide their origin, but though they have been described as probably Roman,¹ they certainly seem to belong to an unburnt burial of the pagan Anglo-Saxon period and are sufficiently distinct from some Roman objects found on the same site.

Further west beyond the Roman road to Norwich a discovery was made in excavating for the railway at Gissing in 1849. At a depth of seven feet were found on the breast of a skeleton a bronze square-headed brooch and a ring-brooch of the same metal, both of which are figured in Dawson Turner's collections.²

About thirty years ago an Anglian burying-place was discovered at Kenninghall in a sandy field sloping to the east and overlooking the present village, about half a mile west of the church.³ In digging for gravel the workmen came upon several graves about two feet from the surface, and various antiquities were found in them. In those of males were the usual iron bosses of shields, swords and spearheads and bronze brooches; in those of females, amber and glass beads, brooches, buckles, etc., generally of well-known Anglo-Saxon types. No urns have been found, so that cremation does not appear to have been the practice of the tribe who settled here. Most of the articles were disposed of before the spot was visited by archæologists, but several good examples were some years afterwards obtained from the place and are in the Fitch room at

¹ *Norfolk Archaeology*, vol. iv. p. 313.

² British Museum, Add. MS. 23,055, fol. 136.

³ *Norfolk Archaeology*, vol. vii. pp. 292, 358.

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Norwich, while another series is preserved in the national collection. This includes a pair of wire hooks with spiral ends (fig. 1) and four large square-headed brooches, some with traces of gilding (fig. 5) ; also a curious silver ornament in the form of a fish. This is $5\frac{1}{2}$ inches in length and bears a remarkable resemblance to another just an inch shorter found in the important cemetery at Kempston in Bedfordshire. From the rivets in the latter it seems probable that both were used as badges, but until more evidence has accumulated it would be unwise to pronounce them symbols of the Christian faith, though such an interpretation is perhaps justified in the case of the Hardingstone jewel found in Northamptonshire and several brooches in fish-form chiefly from the Rhine district. In the early days of persecution the fish was a favourite emblem, as the letters of the Greek word constituted the initials of a confession of faith, only intelligible to Christian converts.

There seems sufficient evidence for classing the burials at Northwold as unburnt, though neither skeletons nor urns are mentioned. In 1839 a necklace was found in removing part of a barrow near Lord Berners' watermill in that parish. The beads were sixty-five in number and comprised fifty-six of dark blue glass with one of rock crystal cut in facets, cubes of variously coloured glass-pastes and other shapes of like material, doubtless of Anglo-Saxon date. Swords and bosses have also been found ;¹ and a few objects in the British Museum, consisting of a long brooch (fig. 6), one smaller and another circular brooch and bracelet clasps (fig. 3), go far to show that this was not a case of cremation. In the absence of a drawing it is somewhat difficult to fix the date of two fragments of silver personal ornaments, said to be portions of girdles. 'They are bands of stout metal, chased with considerable care, the surface being alternately grooved and ornamented with beaded and zigzag lines in relief. One of the fragments measures just over an inch in width, the other rather less than an inch, and a round locket or fastening is hinged upon it like the fastening of a belt. In this is set a silver coin of the Lucretia family. On the obverse is a radiated head of the sun, the reverse having a crescent in the midst of seven stars with the legend L. LVCRETI TRIO. These fragments were found in the Norfolk Fen at Northwold and are supposed to be of Saxon workmanship. They resemble the work of that period in general character and may be compared with some of the silver fragments found at Cuerdale, Lancs. now in the British Museum. The ornaments however appear to be wholly wrought with the tool without the use of the punch.'²

The use of Roman coins as ornaments in Anglo-Saxon times is well illustrated by discoveries in East Anglia. The Northwold specimen, which is a denarius of the Lucretia family and dates from about 74 B.C. occurs on what seems in truth to have been a bracelet, but little can be

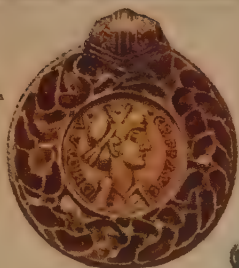
¹ *Journal of British Archaeological Association*, vol. iv. p. 382.

² *Ibid.* vol. xiii. p. 296, which also records the find near the watermill. *Proceedings*, Society of Antiquaries, vol. iii. p. 252. The coin is figured in Babelon's *Monnaies de la République romaine*, vol. ii. p. 153.

NORFOLK



2^a



2^b



3



5



6



7^a



7^b



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safely inferred from the description quoted above. The date must remain uncertain, and if of the Anglo-Saxon period the fragments were more probably influenced by Roman models, of which several are extant, than by the uniformly punched patterns of the Viking period. Though other family coins have been found on Anglo-Saxon sites, the coins adapted for pendants are generally of the Lower Empire.

A silvered base metal coin of Carus found at East or West Walton¹ may be compared with small base pieces of Valens and Gratian found at Stow Heath, Suffolk,² and with another of the Emperor Tacitus (275-6) hung on a ring with two glass beads and found with Frankish remains next a skeleton in a grave outside Cologne.³ It is easy to imagine that the busts on the imperial coinage would exercise some sort of fascination on the Teuton whose early attempts at representing the human face were singularly unsuccessful, as witness the incised brooches and embossed bucket-mounts of the period. But gold would fascinate them more, and Norfolk furnishes two remarkable examples of the coins called *solidi* in the richest of settings.

The first is from the north-east coast and the circumstances of the discovery may be given in the words of Mr. Stevenson, who published it in the *Norfolk Archaeology*⁴ and in the *Numismatic Chronicle*.⁵ At the close of the year 1845 a woman was walking along the beach from Bacton to Mundesley, and on approaching the boundaries of the latter parish saw something that glittered lying on the shore near high-water mark. Having taken up and disengaged it from a branch of seaweed in which it was imbedded she carried it home, not appreciating its worth beyond that of a small roundlet of brass, and of course totally unaware of its claim to peculiar regard. The appearance of the object however, thus accidentally brought to light, led even the simple unskilled finder herself to think that it must be a 'curiosity.' Luckily escaping further injury it passed into the possession of Miss Gurney at North Repps, who generously presented it to the British Museum, where it now figures in a remarkable series of Anglo-Saxon jewellery.

The find proved to be a pendant enclosing a gold coin of the Emperor Mauricius. The obverse (fig. 2a) has the imperial head to right, while on the reverse side (fig. 2b) is the usual legend, *VICTORIA AUGUSTORUM*, the plural referring to Mauricius (582-602) and Theodosius, who was made a colleague in the empire in 590. A final explanation of the letters *CONOB* has yet to be found by numismatists,⁶ but the mint-mark *AR* indicates that Arles in southern France was the place of mintage of the original. Not that this *solidus* is a forgery in the usual sense of the word, though its appearance is certainly against it. More probably it is a copy made by one of the Merovingian kings who took the coinage of the eastern

¹ *Numismatic Chronicle*, new series, vol. v. Proceedings, p. 9.

² *Journal of the British Archaeological Association*, vol. v. p. 361.

³ Coloured drawings of the objects are given in *Collectanea Antiqua*, vol. ii. pl. xxxv.

⁴ Vol. i. p. 194. The jewel is figured at p. 105 of that volume. ⁵ Vol. ix. p. 131, plate.

⁶ Briefly noticed in Sir H. Ellis's paper on the jewel, *Archæologia*, vol. xxxii. p. 64.

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Empire as their model. The mount has been slightly damaged and some of the small slices of garnet with which the cells were originally filled are now missing. Gold foil was placed below the stones to add to their lustre, and the design seems to represent a laurel wreath, which actually occurs on the reverse of the coin though somewhat obliterated on this particular specimen. The disc was suspended by a barrel-shaped loop, no doubt to a chain or necklace, and the extremities of the loop are much worn by continual use. The workmanship is surpassed by many examples of similar work from Kent, but the somewhat free and realistic treatment of the border contrasts with the usual geometrical designs and has yet to find a parallel. Caution is therefore necessary in drawing conclusions from this object, but although found quite alone it may for our present purpose be treated in connection with another relic now to be described.

About the year 1850 a similar jewel was detected in a pit at Wilton near Methwold by some boys who were digging gravel, but nothing else appears to have been discovered at the same time or place.¹ The jewel was soon afterwards purchased by a gentleman at Lakenheath, and was acquired in 1859 for the British Museum where it is now exhibited side by side with the Bacton specimen. The cross is of gold and in the centre is a genuine gold coin of Heraclius I. (613-641) with a double beaded border which occurs on coins of later emperors (as Leo V. in the ninth century) but is not known on any of this period. A closer examination of the object shows that the gold border is of another colour and has been added by the goldsmith who originally mounted the coin. The obverse (fig. 7b) of the coin is on the under side of the pendant and bears the effigies of the emperor and his son Heraclius Constantinus. The reverse (fig. 7a) which forms the centre of the jewel, displays a cross upon a flight of four steps, with the legend **VICTORIA AUGUSTORUM**, an **E** which is probably a mint mark and the mysterious **BOXX**. Three limbs of the jewel and the part immediately surrounding the coin in the centre are filled with pieces of garnet disposed in a sort of mosaic pattern and backed by hatched goldfoil to heighten the brilliancy. To the upper limb is affixed a barrel-shaped bead of gold wire-work and the whole is evidently an ornament designed for suspension from the neck. Unlike the Bacton specimen, the obverse is here placed at the back of the pendant and preference given to the reverse with its cross raised on four steps. This arrangement as well as the form of the setting suggests that the original owner was a Christian, but the goldsmith seems to have displayed more skill than understanding in the production of this very creditable piece of work, for the cross on the coin is upside down; and however poor the die, it is hard to believe that anyone familiar with the type would have blundered in this way. The emperor Heraclius by whom the coin was issued was son of a prefect of Africa of the same name and was born about 575. He de-throned and caused the execution of the emperor Phocas in 610, and after seizing on the vacant throne died in the year 641. His memory was

¹ *Norfolk Archaeology*, vol. iii. p. 375.

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venerated by the early Christian Church, and this may add significance to the fact that his coins have been found in England mounted as pendants.¹

About forty years ago a necklace now in the British Museum was found in an Anglo-Saxon grave at Sarre in Kent, consisting of coloured glass beads and five gold pendants, four of which were coins. By a happy coincidence three of this number bear the image and superscription of the eastern emperors already mentioned, Mauricius and Heraclius while the fourth is a coin of the Frankish king Chlotaire II. (613-628) The Sarre specimens which are simply looped, are excelled by the Norfolk finds with their garnet cell-work. Though a cruciform pendant almost identical with that from Wilton but without the central coin, has been found so near as Ixworth in Suffolk,² nothing of quite the same pattern has occurred among the rich discoveries of Kent, but it is yet permissible to assume a close connection between all these specimens as regards their use, their origin and workmanship.

In his description of the find at Sarre,³ Roach Smith remarks that the gold coins of the eastern empire called *solidi* had been introduced about the year 325, though most of the pieces that found their way to the north-west of Europe belong to the fifth century and specially to its second half.⁴ This was the period of the Gothic and Hunnish ascendancy, and it has been suggested that the minted gold may have passed into Teutonic hands as tribute. Whatever the reason, it is certain that early in the seventh century the Merovingian kings began to coin gold, and took as their model the Byzantine *solidus*. It may well be that the Norfolk pieces were struck by Chlotaire himself, who was a contemporary of Heraclius; and they may further be said with some confidence to have been mounted almost as they are to-day about the middle of the seventh century. Some light is hereby thrown on the date of two other coin-pendants in the national collection. They enclose gold coins of Valens (364-378),⁵ and Valentinian II. (375-392);⁶ and though closely resembling the Bacton specimen in form, are ornamented in the Kentish style with a geometrical design of garnets, and probably date from the seventh century. Nor is the place of manufacture less easy to fix within certain limits. Authorities agree that the Kentish jewellery surpassed all other efforts of Teutonic goldsmiths here or on the continent, and four of the five jewels mentioned bear all the characteristic marks of a Kentish origin. Granted that the barrel-shaped loop of coiled wire has also been found on garnet pendants in Northamptonshire, in Derbyshire and Wiltshire,⁷ the noble series from the King's Field, Faversham, convinces us that this rich and dainty cell-work with its gorgeous play of colour, had its home in Kent from which it seldom spread abroad. But a comparison of the two Norfolk pendants shows that while the method is

¹ *Journal of British Archaeological Association*, vol. viii. p. 140.

² Figured and described in Roach Smith's *Collectanea Antiqua*, vol. iv. pl. xxxviii. fig. 1.

³ *Archæologia Cantiana*, vol. iii. p. 38, pl. ii.

⁴ Sophus Müller, *Nordische Altertümer*, vol. ii. p. 205.

⁵ Locality unknown; figured in *Archæologia*, vol. xxxii. pl. 7, fig. 2.

⁶ Found in Staffordshire.

⁷ *Pagan Saxondom*, pl. i. fig. 3 and pl. xl. fig. 4.

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the same in both cases, they do not exhibit the same style of art. The Bacton wreath of garnets bears some analogy to a piece in the Wieuwerd find,¹ in which the intertwined foliage or plaited cord appears, not carried out in cell-work but in gold filigree. Such applied wire-work is usually characteristic of a later period, but there is every reason to concur in the date assigned, which coincides with that of the East Anglian specimens.

Such an archæological survey of the northern part of East Anglia brings into prominence three main features which may to a certain extent be correlated with the written history of the time. These are the practice of cremation, the signs of Kentish influence, and a partial adoption of a different method of burial.

As already observed, the extensive traces of urn-burial in East Anglia render it necessary to regard this as the primary method of interment among the Anglian peoples. In Norfolk indeed the rite of fire was not exclusively observed, for undoubted unburnt burials have been found, and it is here that the fallacy of observation has to be reckoned with. The farm labourer is not as a rule attracted by bits of bone and crocks the colour of the earth turned up by the ploughshare, but a shower of rain may often lead to a discovery by laying bare a gilded brooch that never passed the fire, but was buried on its owner's breast more than a thousand years ago. Other things being equal the instances of cremation must be considerably added to in order to strike a proper average; and if this be done, urn-burial will be certainly acknowledged as the rule in early Norfolk. But the two chief relics of the Anglo-Saxon period found in this county rather caution us against the opposite error of supposing that even the most attractive relics may readily be traced to the graves in which they were originally deposited. Observation in both these cases was not acute or fortunate enough to discover traces of a cemetery, and it is hard to think that either object had not been buried with an unburnt body somewhere in the immediate neighbourhood. The circumstances at Wilton and Bacton were alike in one important respect, for in both cases the jewel was picked up at the base of a declivity which in all likelihood had been receding regularly for some space of time. Burials on the higher level such as the early races loved may well have passed unnoticed, for the fragile bones would be shattered by the fall and the relics scattered far and wide. Though nothing further seems to have come to light at either spot a keen and practised eye would perhaps have found enough to prove a burial and possibly a cemetery; and the Norfolk jewels, with the third at Ixworth, suggest the thought, how many less attractive ornaments have been lost to archæology. Any one would be struck with the appearance of the precious metal, and its intrinsic value would ensure its preservation as a relic, or at least its acquisition by some one capable of appraising it; while on the other hand the much more usual brooch of bronze is of little interest or value to the casual finder, and passes out of history.

¹ In Friesland, not far from the coast. *Bonner Jahrbücher*, 1867, heft 43, pp. 67, 81.

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The archæological method further brings to light signs of Kentish influence in East Anglia, and so far confirms the meagre testimony of the records. Strictly speaking history begins in England with the coming of Augustine, and it was then that the people of East Anglia looked to Æthelberht of Kent as their sovereign lord. The tie was snapped before the year 616, and Rædwald apparently became an independent monarch,¹ defeating the northern king Æthelfrith on the river Idle in 617. But his prosperity was short-lived and till the battle of Winwaed in 655 East Anglia was in the power of Penda, the champion of paganism in England. A brief interval of Northumbrian supremacy or patronage was followed by more than a century of Mercian dominion, for the midland power, though checked by the defeat at Burford in 754, was advanced by Offa in the latter part of the century. Under him the zenith was passed and Mercia was eclipsed by the rise of an English nation under Ecgbert.

It was mainly therefore under the protection of Kent that pagan East Anglia developed into a kingdom, while the preaching of St. Felix (631-47) came just before the Mercian influence began to be felt eastward of the Fens. There is a local tradition that the school founded by the first bishop of East Anglia with aid from Kent was at Saham Toney, and it is all the more to be regretted that an Anglian cemetery said to have been discovered² there has not been described. Archæological support is given to the belief in Kentish influence throughout East Anglia in the first half of the seventh century by the two jewelled crosses found at Wilton and Ixworth; and if it be objected that these afford but slender evidence, it must be pointed out that the chances are all in favour of their having belonged to Christian converts whose religion sanctioned the interment of the sacred symbol³ with the faithful in place of the pagan array of arms and ornaments. This may in part explain why no relics were found associated with either of the pendants in question, though another explanation is suggested by the important find in the mound at Wieuwerd already referred to. The hoard was evidently not connected with an interment, though a skull was found in another part of the mound; and the deposit, which had been roughly handled, was therefore in all probability the result of a foray into Frankish territory by some Frisian freebooters. The Bacton jewel, found as it was on the beach, may similarly be connected with some raid on the opposite Frankish coast, but it is nevertheless unlikely that such an ornament would have been buried quite alone.

The third point to which attention may be directed is the evidence for two distinct modes of burial in what is now the county of Norfolk. The interment of the unburnt body alone remains to be considered, and though a little light may be thrown on the question by the *Anglo-Saxon Chronicle* and other early authorities, it would be idle to pretend that the answer is as easy as further investigation of English and continental finds

¹ His 'bretwaldadom' is discussed by Hallam in *Archæologia*, vol. xxxii. p. 248.

² Such is the report in the *Norfolk Chronicle*, April, 1852.

³ For the common practice in the eleventh and twelfth centuries see *Archæologia*, vol. xxxv. p. 300.

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may some day render it. Perhaps Kenninghall affords the best typical instance of an unmixed cemetery of extended burials, as the original accounts are fairly explicit and the relics are preserved in a public collection. A glance at the contents of these graves would probably leave no doubt as to the mode of burial, even apart from the finding of skeletons, but would also perhaps prompt the question whether they belonged to an Anglian or some other Teutonic tribe. Prominent among them are large square-headed brooches differing from the common East Anglian type that only expands slightly and gradually from end to end, terminating in a conventional head most like that of a horse (figs. 4, 6). These larger brooches bear a strong family resemblance to a number of remarkable specimens from areas in the midlands which were brought under Mercian influence before the close of the pagan period, as Warwickshire, Gloucestershire, Leicestershire, Northants, Cambridgeshire and Yorkshire.

There seems some reason therefore to class the Norfolk examples as Mercian, and in venturing on a distinction between them and the Anglian examples archæology would be merely adopting a view that has long commended itself to the professed historian; namely, that the early English kingdoms were not homogeneous but grew out of successive independent settlements in areas that lay open at particular periods.

Mercian influence began in East Anglia about the middle of the seventh century, and the brooches in question may have been deposited in pagan or semi-pagan graves any time between the year 634, when Oswald fell at Maserfield in a despairing effort to save East Anglia from the Mercian, and the abolition of the pagan practice of burying ornaments with the dead. If that reform be dated in the middle of the eighth century, the graves of supposed Mercians in East Anglia might be expected to show some traces of Christianity, for the Mercian hold on the kingdom was continuous for a century, and was not relaxed till the defeat and death of Æthelbald at Burford in 754. If the Mercian character of the unburnt burials be insisted on by virtue of the resemblance of the relics to those from known Mercian areas, then it is possible to see in the change from cremation to extended burials the measure of Christian influence among the Anglians of the midlands, who made their new home in the subject kingdom. But it is perhaps impossible to draw a strict line between Mercian and East Anglian remains, for both peoples were in the main of the same stock; and had not both at first burnt their dead, it might be possible for us to show a close connection between them by a comparison of the contents of their graves from the earliest times. As it is, little more can be said than that they agreed to that extent in their funeral customs.

In addition to the jewels described above, a few objects of Anglo-Saxon date have been found in the county apparently unconnected with interments. There is a bare mention¹ of brooches at Oxburgh in the Fens, but two drawings are extant of an interesting specimen from

¹ *Norwich Museum Catalogue*, p. 21.

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Threxton.¹ This is of circular form, having in the centre an engraved lozenge with incurved sides branching into knotwork that occupies the field. It probably dates from the eighth century, but there is no description of the silver coins found with a sword at Reepham.²

Passing now to later times, we have to inquire whether any Danish relics have been found in this part of East Anglia, which belonged to the Danelagh and was in fact the earliest Danish kingdom. It may be inferred from certain social indications 'that Guthrum's Danes did not, like their northern kindred, drive out a portion of the earlier population and establish themselves as a superior class above the remainder, but settled amongst the original East Anglians on a footing of comparative equality.'³ This view is supported by an examination of physical traits in the population of Norfolk. There is, according to Dr. Beddoe,⁴ sufficient evidence to show that this region was very densely settled by a population almost exclusively Teutonic; that is to say, it is more Anglian than either Danish or British, though a Scandinavian district is marked not only by the local place-names but also by a remarkably tall blonde race occupying the hundreds of Flegg in the north-east of the county.

Christianized through Alfred's influence, the Danes have left us little in their graves, but one or two interesting finds of this period have occurred in other parts of the county.

'During the course of the year 1867 some men employed in raising gravel at Santon, found a skeleton laid at full length about two feet below the surface. The spot where the burial had taken place is on the slope of the hill to the north of the church, and at no great distance from the river Ouse.' With the skeleton were found an iron sword, afterwards presented to the British Museum by Rev. W. Weller Poley, and two characteristic Scandinavian brooches (fig. 12), also in the national collection by the gift of Mrs. Weller Poley and Rev. Canon Greenwell.

The shape and ornamentation of the brooches leave no doubt of their origin, as specimens of the type are often found in Norway, Sweden and Denmark, and occasionally in the British Isles. Canon Greenwell, who contributed a complete account of this discovery to the *Proceedings* of the local archæological society,⁵ brings together for comparison a number of similar instances from Orkney, Caithness, Sangay or Sanderay near Harris, the Isle of Barra in the Hebrides, and Islay in North Britain; from the neighbourhoods of Garstang, Lancs. and Bedale, Yorks.; and from Phoenix Park, Dublin. To these may be added several found on the mainland and islands of Scotland, which have been brought together in a lecture⁶ on 'Viking Burials' by Dr. Joseph Anderson of Edinburgh.

¹ *Norfolk Archæology*, vol. iv. p. 363, and p. 358, fig. 5; Roach Smith's *Collectanea Antiqua*, vol. iii. p. 209.

² *Journal of Archæological Institute*, vol. xxvi. p. 364.

³ Robertson's *Scotland under her early Kings*, vol. ii. pp. 435, 240.

⁴ *Races of Britain*, pp. 64, 254.

⁵ *Bury and West Suffolk Archæological Society*, vol. iv. (1874) p. 208, where one of the brooches is figured.

⁶ *Scotland in Pagan Times* (Iron Age), chap. i.

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Though it will be observed that most of the known specimens come from the northern islands, where the Scandinavian and especially Norwegian influence was most felt, there is enough evidence to show that the Vikings, who were roving the northern seas in the ninth century, penetrated inland and were laid to rest on the banks of rivers which had given them access to the interior of England.

As is generally the case, the brooches found at Santon were a pair, and are sufficiently preserved to afford a good idea of their original appearance. Each measures just over $4\frac{1}{2}$ inches in length, $3\frac{1}{4}$ inches in width, and just over $1\frac{1}{2}$ inches in height, having at the back a hinge upon which the iron pin moved and a catch into which it fastened. These tortoise brooches, as they are sometimes called, are made up of two bronze or other metal¹ plates, which are domed and of oval plan, one fitting inside the other. The outer is gilt and ornamented with open work and engraved interlacing designs after having been cast, and the inner plate is also gilt but quite plain and, showing through the openings of the outer case, gives a more handsome appearance to the whole. The method of casting is described by Canon Greenwell and by Hans Hildebrand,² to account for the impress of some textile on the inside of the brooch. A stone mould of the convex side was made, and in the hollow was laid one or possibly more than one thickness of cloth, which was then pressed down with clay to form the other half of the mould. The cloth was next burnt away and the molten metal introduced in its place; so that the mould which had received an exact impression of the texture of the cloth transmitted it with similar fidelity to the surface of the bronze. On the front of both of these brooches are five pierced bosses produced in the casting, and four discs which evidently were originally set with thick studs of pearl, ivory, or some other perishable substance, as the pins that held them are still in position. Some of the bosses were joined by threads of twisted silver wire, which ran in grooves along lines dividing the open-work panels. From a comparison with remains of a somewhat later period from the south-eastern shores of the Baltic, it is clear that these brooches were worn on the breast below both shoulders to fasten the upper garment, but were probably not connected with long hanging chains as are the Livonian specimens.

The sword found with the pair of brooches is characteristic of the same period, and is of the ordinary Scandinavian form. It is now over 31 inches long, but has lost a portion at the point; the grip of the handle, which has a pommel of three lobes, is $3\frac{1}{4}$ inches long, and the curved guard is nearly 4 inches wide from point to point. A very similar specimen, presented to the British Museum by Rev. Greville Chester, was dredged up from the Wensum at Norwich, and only differs in having a shorter guard, just overlapping the blade, the latter in both cases having had a shallow groove on each side from end to

¹ Dr. Anderson gives analyses to show that copper, zinc and lead enter into the composition of some specimens.

² *Industrial Arts of Scandinavia in the Pagan Time*, p. 130.

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end. So far as this evidence goes, the Scandinavian pirates of the ninth century appear to have entered Norfolk from the sea both on the east and west, reaching Norwich from Yarmouth, and crossing the Fens from the Wash to the south-western corner of the present county.

It is perhaps hazardous to assign a more exact date to these swords and brooches than the Viking period, which is generally reckoned from the year 700 to 1000 A.D. But it is even more rash to assume that during three centuries no progress was made and no innovations introduced into the arts of a people whose opportunities for inspecting and appropriating the latest artistic productions of Europe were unequalled. They were more than borrowers: they assimilated new ideas and evolved artistic forms peculiarly their own, as witness the 'grasping animal' motive of the tenth century, and the Thor's hammer of the latter part of that century. The appearance of such new features can be approximately dated by the coins that constantly occur in finds of jewellery; and it may some day be possible to go a step further and trace the sequence of the various forms of weapons, especially the sword, during this period.

The sword of the early Anglo-Saxons may be readily distinguished from the pattern introduced by the Scandinavian pirates and settlers of the ninth and following centuries; for while the weapon found in many of our pagan graves has a long straight blade, a diminutive pommel and no metal guard, the Danes carried a wider, tapering blade, with a projecting guard and heavy pommel, both of metal. The wooden handles, guards and pommels of the former have almost invariably perished, but the blade and tang that still remain are of such uniform shape and size that it is difficult to imagine that there was much divergence in the shape and character of the more perishable parts. In the British Museum is a sword-handle that may be regarded as typical of the pagan period. It is in almost perfect preservation, and consists of three parts, all of wood. The grip is grooved transversely, and at each end is a cross-piece, slightly swelling in the centre but at right angles to the grip. The socket of the guard is just of a size to admit the usual type of blade found in the graves, and part of the tang still remains inside the grip.

This view is supported by the representations on the Franks casket, which dates from about 700. Many warriors appear on the top and sides carved in whalebone; and the sword is always of one pattern, the handle exactly corresponding with the extant specimen just described. When this type was abolished in favour of a more durable and handy weapon is hard to determine, but the old pattern was probably not retained long after the northmen began to vex our shores. It is unlikely that a fighting race would, after the introduction of a metal guard by their enemies, be content to oppose them with their own traditional weapon, which was distinctly inferior in more than one respect. The Scandinavian swords have heavy trilobed pommels, and metal guards which either run straight across or curve away from the grip. Of the Norfolk specimens,

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both of which belong to the latter variety, one was found in a burial and might be supposed to date the other which fell by some accident into the river at Norwich. Both might be referred to the earlier Viking terror of King Alfred's time and the early Danish kingdom in East Anglia, especially as Guthrum became a Christian in 878, and the practice of burying weapons and ornaments with the dead would cease as the new faith spread among his subjects. But according to the evidence at present available, the type with the long straight guard was the earlier of the two, and may have been derived from the same source as the early Anglo-Saxon specimens, as the main difference consists in the substitution of metal for wooden mounts. In a number of graves excavated in Sweden the Santon type was invariably associated with relics of a later date than the year 1000, while the straight guard and triangular pommel accompanied interments of the three preceding centuries.¹ But this may not be altogether decisive for specimens found in England, for it must be observed that the ornament on the Santon brooch does not include the grasping figure that is seldom absent from these and some other ornaments produced in Scandinavia towards the close of the Viking period. And finally there are examples of tortoise brooches, as those from Barra in the national collection, which do present the motive just mentioned, and at the same time leave no doubt that they are later and degenerate specimens, in which the open-work and double front are no longer to be seen, and the bosses have dwindled into studs that barely project from the surface. This decadent form differs in almost every detail from what is supposed to have been the original type, a quadruped of some kind seen from above ; but intermediate stages have been noticed in the island of Bornholm and elsewhere, and an instructive series figured² to show the evolution of the tortoise brooch during several centuries of northern art.

Of coins dating from the later Anglo-Saxon period many have been found in the county but few localities are mentioned. A silver penny of Coenwulf, king of Mercia (796-822) is recorded³ from Bircham Tofts, but the chief interest lies in the mints and names of moneyers. Coins were struck in East Anglia under eight Anglian kings, only three of whom are known to history, the series beginning with Beonna, about 760 ; and the peculiar series bearing the name of the martyred king St. Edmund were struck at the end of the ninth and during the earliest years of the tenth century. But the first pieces showing the place of mintage were struck at Norwich in the reign of Æthelstan I.⁴ The Thetford mint seems to date from the reign of Eadgar, and there may perhaps have been a mint at Castle Rising in the time of Alfred. Coins of Edward the Confessor were issued from Dereham and there are some indications of a mint at Walsingham. Specimens of local coins are

¹ *Archæologia*, vol. 50. p. 532.

² *Antiquaires du Nord, Mémoires* (1890), p. 12, figs. 16-33.

³ *Norfolk Archæology*, vol. viii. p. 331.

⁴ *Journal of British Archæological Association*, vol. xxxvi. pp. 105, 291.

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figured in Martin's *History of Thetford*,¹ and some from the Norwich mint are given in Mason's *History of Norfolk* ; while the whole question of the East Anglian coinage has been discussed by Daniel Haigh in the *Numismatic Chronicle*.² From the ethnological point of view the coinage yields some interesting evidence for the parts of England subject to the Vikings. The names of the moneyers show that there must have been following their banners a very mixed nationality, by no means of pure Scandinavian blood. In the lists are two varieties of un-English names, some which appear to be Frankish and others which are certainly Scandinavian. Under Eadwig the Frankish names grow fewer, and almost disappear by the time of Æthelred II., while the Scandinavian naturally continue in large numbers. Three alternative explanations are suggested : perhaps 'there were a great many Frankish soldiers in that portion of the great army which, under Guthrum, settled in East Anglia and Mercia ; or the army brought over a certain number of Frankish thralls who, having some skill in metal work, were employed to engrave dies and were authorized to place their names upon them ; or finally, the coins were issued by traders, and the majority of these in East Anglia at this time were men of Frankish descent.'³

Concerning the date of the many remarkable earthworks attributed to Anglians or Danes in this county it is difficult to say anything that may not presently be upset by historical research or excavation. The view put forward by the late Mr. Geo. T. Clark has recently met with unfavourable criticism in more than one quarter ;⁴ and many of the mounds and base-courts generally known as Anglo-Saxon burhs may presently turn out to be Norman motes. All that can be given here is a reference to plans and descriptions of the principal Norfolk earthworks, which are at Castle Acre,⁵ Thetford, Mileham,⁶ Denton,⁷ Buckenham,⁸ Castle Rising⁹ and Norwich.¹⁰

¹ p. 32, supplemented in *Norfolk Archæology*, vol. iii. p. 30. ² Vol. iv. (1841), pp. 34, 195.

³ Grueber and Keary, *Catalogue of English Coins* (British Museum), vol. ii. p. xlv. ; see also pp. xxix., ciii., cxii., cxiii. for particulars of Norfolk coins.

⁴ *Quarterly Review*, July, 1894, p. 43 ; *Scottish Review*, October, 1898, p. 209 ; Society of Antiquaries of Scotland, *Proceedings*, 1899-1900, p. 260.

⁵ *Journal of Archæological Institute*, vol. xlvi. p. 282.

⁶ *Norfolk Archæology*, vol. viii. p. 10 (plan).

⁷ *Op. cit.* vol. ix. p. 335 (plan).

⁸ *Op. cit.* vol. xi. p. 137.

⁹ *Op. cit.* vol. iv. p. 59 (plan).

¹⁰ *Journal of British Archæological Association*, 1858, pp. 9-13 (plans).

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